An Introduction to the History and Culture of Roman Seafaring

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By
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ABSTRACT

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During the Bronze Age and the Iron Age, ships were constructed using the mortise-and-tenon method, but by the Byzantine era metal or wooden nails had replaced this method. This fundamental shift occurred gradually over the first centuries of the modern era, which suggests a relationship existed between the Romans and these developments. The transformation of hull construction occurred in response to changes in the size and frequency of mercantile shipping, which in turn were fostered by the political, social, and economic conditions of the Roman Empire. A marked aversion to seafaring in Rome’s early history makes this all the more intriguing. This thesis explores the relationship between the changes in Mediterranean shipping technology and Rome’s evolving relationship with the Mediterranean Sea. Chapter One explores changes in shipping technology and culture over a broad period of time. A diachronic study of shipwrecks forms the backbone of the discussion, and is supplemented by discussion of ports, shipping routes, and anchors. Chapter Two traces the Roman cultural outlook on ships and seafaring from the early republic to the late empire. The methodology utilized herein is multi-disciplinary, drawing data from archaeology, historiography, and philology to piece together broad trends.
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Introduction: An Apologia and Prolegomenon

This project began life as an entirely different creature; it morphed into a multi-headed hydra; and has only temporarily been hacked down to this format. The original intention was to emulate the work that Shelley Wachsmann did for Bronze Age seafaring in his seminal book *Seagoing Ships and Seamanship in the Bronze Age Levant* in the context of the Roman world.\(^1\) In this work, Wachsmann distinguished different types of ships and maritime practices by culture and formed specific definitions for each distinct ‘maritime culture.’ Nothing of this nature has been done regarding the Roman era. Thus, by using the same multidisciplinary methodology, I hoped to pursue an understanding of whether a unique Roman maritime culture existed and if so what its characteristics were. Evidence for this paper was to be categorized by region; the following were the particular provinces and cities intended as case studies: Britannia, Judea, Egyptus and the Red Sea, Pompeii, and Ostia. Many problems obfuscated this trajectory, including a questioning of Wachsmann’s basic premise. It became apparent that certain preliminary research was necessary before such an endeavor could be adequately undertaken. Moreover, through my early research I had seen two trends that seemed interrelated and merited further investigation. First, ships and shipping had been a crucial element of Mediterranean life since the beginnings of the Bronze Age, but the most significant change in construction, size, and routes of shipping occurred during the time in which Rome was in power. Second, the Romans themselves often demonstrated a particular aversion to maritime activity, in spite of the previously mentioned trend of transformation. Thus, the two chapters that follow are constructed to

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give an introduction to into both the changes in shipping that occurred as well as the history of Roman seafaring and attitudes towards it. The relationship between the two subjects has been the revised focus of my thesis and forced me to shift the organization of my research, leaving much of the case study material for another project.

The main issue that forced me to change the direction of my research and writing was of course the incredible breadth of the topic. When discussing what was occurring on the Mediterranean, it is very difficult to limit the time period and geography because everything is interconnected. Connectivity was the of hallmark the Mediterranean; it was the medium which allowed people to explore, connect, and exchange. So while the early Roman Empire was the heart of my discussion, the larger picture encompasses several hundred years, from before the founding of the city sometime during 8th century BCE to the relocation of the capital to Byzantium in the 5th century CE. A narrower focus would indeed simplify the problem, but the technological change and diffusion occurred gradually over an extended period of time and too narrow a focus would fail to demonstrate this.

Additionally, the geographic expanse of the Roman Empire was extensive, making the study of the Roman Empire both fascinating and difficult. As a result, many scholars specialize in certain regions and this common, intensified specialization can be detrimental when attempting to compare disparate regions. This is an especially damning factor when studying Rome within the context of Mediterranean seafaring; Rome’s maritime culture cannot be understood if studied as though it existed in a vacuum because predecessors, neighbors, and rivals shaped it. The Romans were responding to the long establish maritime traditions of the Greeks, Etruscans, and Carthaginians, and it would be a disservice to omit such an underlying factor.

And finally, the nature of my research and modified topic required that I drew from a great breadth of scholarship. This is not a history paper, nor an archaeology report, nor a literature review. It is all three and more. I believe that a highly interdisciplinary approach is the best method for studying this material. The each field of study has its own strengths and weaknesses,
but can reinforce, complement, and enhance an argument when combined. This multidisciplinary approach is especially useful in the context of Mediterranean seafaring activity, which involves such broad spans of time, geographical zones, and cultural groups. While the two following chapters serve as solid foundations for the topic of Roman maritime culture, and they are completed to the best of my ability given current time restrictions, length, and available resources, I do not consider them to be an end product. Rather, these two chapters should serve as a basis from which to explore the aforementioned case studies and delve into additional topics of linguistics and anthropology of technology.
Chapter 1:

The Development of Shipbuilding Methods During the Roman Empire

Introduction

This chapter follows the evidence made available by the recent advent of underwater archaeology in studying the maritime culture of the Mediterranean during the Roman Empire. In particular, I focus on the gradual changes that occurred in ship construction during antiquity. The components of this chapter are as follows: first, a brief review of maritime archaeology, its benefits, and its limitations; second, a discussion on maritime culture and general theory behind that construction; next, a review of select shipwrecks and the development of hull construction methods over time; and finally, brief discussion of the related topics of tonnage, anchors, ports of call, and shipping routes. When brought together, these disparate focuses clarify our understanding of the gradual change in ships and seafaring from the pre-Roman tradition of building ships that carried mixed cargoes to small ports using the mortise-and-tenon method to building ships with nails and spikes ships carrying single item cargos to major ports in the Roman times and beyond.

Underwater Archaeology

Conducting archaeology in underwater environments allows archaeologists to study maritime practices through the excavation and preservation of material remains that have been deposited under the waves. This sub-discipline of archaeology developed in the later half of the twentieth century and has evolved quickly from damaging salvage operations to rigorously scientific

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2 I use the terms ‘maritime archaeology’ and ‘underwater archaeology’ interchangeably in these chapters, the actual distinction being that maritime archaeology is the study of all material pertinent to maritime culture, including items excavated from a submerged context, whereas underwater archaeology is simply the material remains that are found underwater. Clearly, a significant degree of overlap exists between these two terms, and that is my justification for using them synonymously.
excavations on par with the quality of land excavations. Besides shipwrecks, the hallmark focus of underwater excavations, additional artifacts studied under this heading include but are not limited to: ports, breakwater installations, anchors, and submerged terrestrial sites. The excavation of ancient shipwrecks forms the primary resource for maritime archaeologists and as such will be the focus on the remainder of this chapter. Each excavated site offers a unique, direct window into the technology, connectivity, and commerce of ancient civilizations. Acknowledgement of the benefits and drawbacks of archaeological shipwrecks helps to frame the subsequent discussion of evidence obtained from this discipline.

The fact that shipwrecks were a common occurrence in antiquity, as suggested by the ancient literary sources, is corroborated by the wealth of material that has been located in the shallow coastal shelves of the Mediterranean sea. Sponge divers, the best of whom are able to free dive almost 200 meters, have encountered ancient wreck sites on a regular basis since antiquity. The remains of these ancient ships were often overlooked because they appeared to them as no more than ‘fields of amphorae’ and had little financial value unless there were obvious metal remains like anchors or ingots. The first recovery of submerged cultural resources for archaeological purposes began in the early 1900s, when sponge divers and the Greek Antiquities Authority salvaged the cargo of an ancient ship at Antikythera in the Aegean. Although this ‘excavation’ was characterized as rough salvage and conducted without any deliberate methodology, the Antikythera wreck demonstrated the wealth of material and information that lies on the seafloor.

The invention of the aqualung by Emile Gangan and Jacques Cousteau in the 1940s changed the demographics of who could explore the underwater environment. The subsequent
development of Self Contained Underwater Breathing Apparatus (SCUBA) gear for recreational diving meant that archaeologists were no longer forced to rely on the eyes and ears of sponge divers. With a little training, the researchers could conduct the dives themselves, see the wrecks in person, and study the material objects in context. This advent laid the foundation for the field of maritime archaeology, because recording of context is of paramount importance in excavations and it is easier to train an archeologist to dive rather than training a diver to conduct archaeology. Still the field developed slowly during the 1950s and 1960s, departing from the earlier enterprises like the Antikythera salvage with its minimal methods and treasure hunting mentality.

Underwater excavation techniques were constantly improved to be more akin to land excavations and a more scientifically rigorous attitudes have been vigorously pursued. Maritime archaeology was fully realized as a discipline in the late 1970s with the excavations of the Cape Gelidonya and Uluburun ships. In the last decade, the field has achieved an accumulation of enough substantial publications for scholars to begin to compare finds and piece together broader trends and features of ancient seafaring. The future of maritime archaeology is bright as recent technological developments are finding their way into the marine archaeologists tool kit. New techniques to preserve waterlogged wood by injecting a resin have allowed researchers to preserve ship remains that previously would have disintegrated immediately upon expose to air; and with increased preservation of wooden and other organic elements, carbon 14 isotope dating can be used to get more accurate dating estimations. Side scan sonar, for instance, allows archaeologists to survey large swaths of the sea floor and remote-controlled submersibles open access to deep-water horizons, remote operates vehicles are able to reach depths impossible to humans and

10 A great deal of effort is made by those in the underwater archaeology community to follow rigorous scientific standards, not only because of academic expectations but also because of the cognitive association between shipwrecks and treasure hunting made vogue by modern media and entertainment.
12 Bowens
record their finds in high definition film, and digital imaging programs allow archaeologists to digitally reconstruct cargo and hull layouts based on finds.\textsuperscript{13} These are but a few of the directions in which the field is already moving, thus the next several years promises to be fruitful as archaeologists expand the scope and efficiency of their work.

Maritime archaeologists face a number of unique challenges while excavating underwater. Work time is limited by the amount of air that can be carried by each member of the excavation team; on land a volunteer is expected to work a full day, but divers are limited to only a few hours in the most favorable conditions. The human body can only dive to limited depths due to exponentially increasing pressure. What is more, the compressed air that divers rely on - normally consisting of 21 percent oxygen and 79 percent nitrogen – becomes hazardous at depth. Nitrogen becomes intoxicating and impedes judgment at about 100 feet, meanwhile oxygen becomes toxic at 130 feet. Water and air temperatures further reduce the amount of time a human can comfortably and safely work underwater. Moreover, conditions underwater are variable depending on the season, location, and surface weather. Underwater currents, surge, and low visibility can all make the work difficult and dangerous.\textsuperscript{14} As a result of all these factors, excavations underwater often require significantly more planning and preparation by the dig team; underwater excavations demand unique resources and equipment; and they often take more time than land excavations. Planning, equipment, and safety all come with a high price tag, the price \textit{per diem} for operating an underwater excavation can be astronomical.

The same dynamics that make underwater excavations challenging also wreak havok on shipwrecks and submerged coastal sites. For any object to be preserved underwater, let alone an ancient wooden vessel, a series of fortuitous conditions must prevail. The same wind, waves, tides, rocks, and eddies that swamped a vessel are also wholly capable of scattering a ship and its cargo into unrecognizable pieces that are too dispersed to even to detect. Materials that are or-

\textsuperscript{13} Bowens
\textsuperscript{14} Bowens 39.
ganic and perishable simply do not last the test of time, especially in the corrosive environment of salt water and when reclaimed by marine life. Marine worms will completely consume unprotected wooden material, even in vessels that are still afloat. Prolonged exposure to aquatic environments breaks down cellular structure in organic materials, necessitating rigorous cleaning and chemical stabilization processes in the preservation process. To make matters worse, modern fishing techniques of dragging massive nets across the sea floor have been known to not only disrupt sites, but totally destroy them.

On the other hand, there are plenty of natural processes that can aid in the preservation of ancient materials given the right combination of circumstances. If, a wreck comes to rest just right on a sandy bottom between large rock clusters it has a greater change of being preserved intact. Sometimes, when the vessel does not capsize on the surface or during descent to the seafloor, the cargo still in the hull can form a thick, protective barrier against environmental and biological damage. Perhaps the most ideal conditions for preservation occur when wave, tide, and surge immediately cover a wreck with a thick layer of sediment deposits, thereby locking it into a protective, anaerobic environment. On land, many sites run the risk of having been altered by later human activity, but an advantage of conducting archaeology underwater is the fact that there are not multiple occupation layers to contend with, generally human tampering with the remains has been minimal, and if it has occurred, only in the last 40 years.

The value of the shipwrecks that are preserved by such fortuitous situations is immense. Shipwrecks serve as time capsules, preserving a snapshot of the era in which the vessel was lost, to the detriment of the crew, their ship, and her cargo, but to the great advantage of those wishing

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15 Bowens 40.
16 Many excavation reports note this as the setup of their site, for instance both the Uluburun wreck and the Tektas Burnu wreck were wedged between large rock formations.
17 Bowens 17.
18 Maritime archaeology is notorious for being the haunt of ship fetishists, who get overly invested in the technical details and largely fail to make their research relevant to the larger academic community. Thus, although my first section focuses on maritime archaeology, a selection of ships, and particular aspects of construction as data points, my second section focuses on the context. The history and literature of Rome embeds the catalog of ships given here in the larger geographic and political contexts of Mediterranean maritime culture.
to study our past relations with the sea. Each artifact that is excavated, studied, and published adds to our understanding of ancient Mediterranean maritime culture. Traditional archaeology on land can contribute artifacts related to seafaring, but such examples envision the activity from the sidelines. The best, most direct evidence for seaborne trade networks are the remains of sunken ships and cargoes themselves, because excavated boats contain hints about when they were constructed and by which culture, in addition to the technical capabilities of the architects who constructed them. Ancient seafaring practices cannot adequately be studied from shore without the researcher diving in, so to speak, because shipping is a transitional process that leaves no permanent marker on the sea’s surface.

Like any photograph or image, each snapshot is worth a thousand words, but it is not always clear exactly which words or what the context is. With ancient wrecks, unlike many modern cases like the *RMS Titanic* or the *CSS Alabama*, no precise historical accounts exist that identify particular wrecks nor do logbooks giving the intimate details of the voyage survive. Everything must be pieced together from the material remains. As discussed before, the disruption of hull and cargo during deposition as well as the decay of organic materials make interpretation problematic. It is possible to pinpoint such details based on what was left of the wreckage and scattered cargo, but often revelations have been the result of comparison between excavated sites.

Despite the many obstacles archaeologists face while working underwater, they continue to pursue excavation of shipwrecks, because they alone can give scholars access to the problem solving of ancient boat builders: what materials did they use, how did they use them, and what do these things say about their construction philosophy? The late Richard Steffy’s approach to maritime archaeology considered the conceptualization underlying a design; he proposed that an individual shipwright’s cultural and personal construction preferences could be detected in details of

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19 Throckmorton 40.
This approach allows minute technical details to speak to the larger picture of maritime culture:

The study of ship remains begins with the recording of seemingly trivial details: the thickness of a plank, the numbers and size of nails, the direction of an adze stroke, the color and texture of stains in half-rotten bits of wood. In fact, some of those details and measurements are trivial, but it is often difficult to distinguish the trivial from the significant until long after the recording is finished. Those tool marks and stains, grain patterns, and botched repairs are the voices of the people who owned, built, and sailed the vessels archaeologists excavate and ship specialists study. Their voices can tell us who they were and why they built their boats and ships the way they did. The great temptation in archaeological ship studies is to concentrate on the technical specifics of joinery and assembly sequences and ignore broader social and economic conditions. While minutiae are vital to the reconstruction of ship remains, a purely technological approach puts shipbuilding in a vacuum, where voices do not carry.

Thus shipwrecks give us direct look at maritime culture by providing us with details about the essential feature of seafaring, technology, the ship itself.

**Maritime Culture**

What is maritime culture and what is its relationship to underwater archaeology? In sum, the term maritime culture refers to the entire collection of a societies’ interaction with the sea. This includes the cumulative collection of technology, social organization, attitudes, and economic practices relating to ships, shipping, seafaring, marine navigation, and the individuals who worked with the sea in a particular society. One of the fundamental questions about maritime culture is how widely distributed specific practices can be. Are they, on the one hand, particular to only one cultural group or, on the other hand, do many different groups in the larger Mediterranean use very similar methods? This section will discuss some of the principles that underlie this assumption and their implications for the history of seafaring.

First and foremost, technology must be considered as subset under the larger milieu of ‘culture.’ Technology is a critical, informative facet of a society on par with the more traditional markers like religion and language. As such, when a member of a given culture constructs a ves-

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21 Hocker and Ward, 2
22 Throckmorton 22.
sel, there are certain culturally shared tastes, beliefs, and practices that lead that individual to produce a boat that bears certain unified cultural markers. Boats, however, were highly mobile reservoirs of culture consisting of ideas about building practices, methods, and materials. Ships therefore were able not only to distribute the commodities and passengers that they carried, but they also spread their own design. Thus in perusing the conceptualization of a particular maritime culture, one must be careful to distinguish between unique, indigenous preferences on the one hand and adopted or transmitted aspects on the other.

Maritime culture is constantly changing and evolving, especially if it is a larger inter-cultural feature of ancient life. Change over time in ship construction, average tonnage, anchor usage, size and distribution of ports, and shipping routes can be modeled analogous to a process of evolution, with factors like adaptability and performance being selected for. Excavations from different regions and eras provide glimpses of different stages of such an evolutionary trajectory. Diachronic, multi-region studies of these excavations might indicate to researchers where innovation occurred, how quickly it spread, and the rate at which older methods were phased out of use. Like biological evolution, the development of technology does not occur spontaneously; rather, shifts occur slowly, which requires a broad span of time be included in the study. Evolution may not be a perfect model for the way technology changes and spreads, because of the deliberate craftsmanship involved, but it does provide the best conceptualization to understand changes in boat construction.

Early, localized seafaring practices were informed by indigenous technology, which arose from particular cultural-ecological settings. Naturally, each society’s boat construction practices were informed by the physical limitations and resources of their immediate geography and climate. Following this logic, distinct cultures will have different seafaring practices and

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23 In order for seafaring technology to be considered an aspect of culture and not simply an aspect of the human condition, it must be culturally specific. This is undergirded by the assumption that there existed culturally specific practices that were localized to certain regions, peoples, and time periods. Shelley Waschmann argues just that in his book *Seagoing Ships and Seamanship in the Bronze Age Levant*. He
styles of ships. This is precisely what Shelley Wachsmann’s book *Seagoing Ships and Seaman-
ship in the Bronze Age Levant* affirms, as the book is divided into chapters discussing the unique
features of each regional or cultural group. While there may be some validity to the basic argu-
ment that different peoples at that time had distinct watercraft, many of those distinctions can be
attributed to environment and practicality rather than to distinct maritime culture. The adage
‘form follows function’ applies to ancient boats, especially given the limitations of their primary
building material, wood. Thus most merchant ships would have been constructed with deep,
beamy hulls to accommodate cargo and would have been fitted with mast, sail, and rigging, because
that method of propulsion only required a small crew and was flexible. If anything, the seagoing
ships that the Phoenicians, the Mycenaean’s, the Cretans, and the Egyptians built had more in
common than not.

Seafaring holds a particular niche in culture, because of its prominent role in the inter-
cultural interactions of the ancient world. Boats allowed communities to attain wealth by the ex-
change of goods, by raiding coastal villages, or by transporting troops for conquest. Moreover,
the influx of wealth can either reinforce culture within a society or bring an influx of innovation
and change. Of particular interest to this discussion is the fact that shipping and seafaring became
vehicles of cross-cultural exchange as a result of the movement of people, ideas, and technology.
Thus the ship is a medium of cultural exchange between merchants, pirates, or diplomats, as well
as a point of technological exchange when the construction methods of the boat itself are copied
by another culture. Maritime archaeologists Hocker and Ward acknowledge the conflict between
the field’s tendency to seek out and impose distinctions on the one hand and the dispersion and
homogenization of boat features on the other:

Anthropologists are often interested in the regional or cultural origins of watercraft, and
there is a well-defined history of such studies. Can a particular vessel type be tied to a
distinct cultural group (as cogs are often thought to be strongly, although not exclusively,
related to the low German speaking people of northern Germany and the low countries, or do different vessel types used by a certain group of people have anything in common that might be a result of a common cultural background? There is also a long history of regional or national delimitation to ship studies, with the focus more on defining the characteristics of particular ethnic traditions than on the communication of ideas between regions. Bronze Age ship studies in the Mediterranean are traditionally based on such classification of Egyptian shipbuilding, Syro-Canaanite ships, Minoan ships, and so on. This is partly due to the nature of the evidence, which is long on text and representation and short on hull remains, but also due to regional specializations in Bronze Age archaeology as a whole. Unfortunately, ships are the ultimate form of portable, and thus transferable technology in preindustrial societies, so shipbuilding methods do not always observe cultural or geographical boundaries. 24

For this very reason, the suggestion that there were many distinct types of ships built only by a single cultural group is unlikely, especially when a cultural group had been constantly exposed to new ideas of maritime technology through trade. It is possible that homogenization occurred largely due to functional necessity and the spread of maritime practices between communities via seaborne commerce, so that as connectivity of the groups increased, the distinctions in ship construction practices decreased.

If, already in the Bronze Age, cultural parameters of maritime culture are blurred as a result of connectivity and trade, then certainly the conditions of the Roman Empire would have made delineations even unlikely for ships during the 1st and 2nd centuries CE. Political unity is a hallmark of the Roman Empire, which established roman provinces around the Mediterranean sea. The Roman Empire controlled or had access to all active ports in the Mediterranean. The extensive scope of their territory meant that many merchant ships could have chosen to travel farther and across many distinct regions. In addition, commodities were being imported from locations beyond the Mediterranean sea basin from locations such as India and Britain, which required vessels capable of venturing into the Atlantic and Indian oceans. Presumably vessels that could manage a variety of climates became more desirable for any engaged in far-flung trade, while those with local ambition or needs would have retained cultural distinctiveness in short-

24 Hocker and Ward 4. I include this quote because of its subtle allusion to and rejection of Shelley Wachsmann’s work. The two authors that co-wrote this chapter are a product of the Texas A&M nautical archaeology program, but are clearly voicing their disagreement with his over-arching argument and thus the dominant, unquestioned role this volume has had in the field for the last decade.
distance and specialized craft. All these factors resulted in an unprecedented level of interconnc-

tivity and exchange of maritime culture, which would have a homogenizing effect on the overall

maritime culture of the region. While Rome is renown for its many other technical achievements,

improvements to the size and strength of cargo-vessels should also be considered one of the tech-
nological innovations that the western world inherited from Rome’s hegemony.

Catalog of Ships

In order to trace changes in boat construction over the course of time, I have complied a

brief list of shipwrecks from the ancient Mediterranean.25 The two primary structural aspects that

this list focuses on are the increase in tonnage capacity and the shift away from shell-based con-

struction.26 While there are many distinct properties of ship construction, tonnage capacity and

the method of hull construction will be key to this study for a number of reasons. First, they are

accessible even without extensive knowledge of nautical terminology and architecture, thus the

essential function of the vessels can be discussed without diverting too greatly into nautical jargon and technicality. Second, size and tonnage are interchangeable variables, and can be gues-

stimated even with meager material evidence. In a similar vein, only a small piece of hull frag-

ment is necessary to determine how the hull’s planks were joined together. Thus, these two vari-

ables can be studied even with limited or indirect evidence. Most importantly, however, these two

25 The ideal format of this information would be a dynamic list, available to scholars through the Internet, of all excavated ships and harbors known to date. A list would facilitate thorough comparison and classification, two of the key approaches to archaeology. The current status of the material is that one must search ship by ship in isolated articles. The flexibility and accessibility of the Internet must absolutely be utilized by the field to make a permanent and updatable database. Such a database could be made searchable by a number of factors including find site, excavation team, proposed provenance, cargo contents, size, proposed era, and of course details about hull remains. When new sites are discovered and excavated, they should simply be plugged into the database, thereby expanding the comparable materials. This is not the first time this has been suggested, but the actualization of such a database has not yet been realized. In an article from the International Journal of Nautical Archaeology I found that “complete catalogue of known wrecks has been in preparation for some time” by scholars Parker and Painter, but that was in 1979. Where is it? What came of this? This project has not come to fruition. Additionally the Institute of Nautical Archaeology has a wikipedia page with an incomplete version of such a database. It includes a list of less than 200 ships, most with minimal information. I believe that the scattered nature of the literature has made satisfactory construction of this list at all but impossible. In order for this goal to be achieved, publication of material must be more common and reliable and institutions will have to work in cooperation with one another.

26 See Appendix 2
features are correlate to one another. Larger hulls allowed ships to carry greater tonnage and sustain harsher weather conditions, but these factors put increasing strain on a hull and therefore required more internal stabilization and reinforcement. The range and purpose of shipping during the Roman Empire is crucial to understanding how the Romans related to and appreciated maritime activity.

This list represents the beginning of a diachronic study of ship technology in the ancient Mediterranean. By selecting wrecks from each era we can compare changes and track development over time. A number of the ships listed either pre-date or post-date the Roman Empire in order to encompass a longer span of time. Such a wide angle view makes it possible to see the period in which the 'philosophy of shipbuilding began to shift. Selection of data points was primarily based on depth of information available in excavation reports. Shipwrecks were included in this list when there was sufficient information in the academic literature to determine the time period the boat was used, and to indicate the method of connecting side planking, and to estimate cargo size. These examples include the Cape Gelidonya shipwreck, the Uluburun wreck, the Kyrenia ship, the Tektas Burnu wreck, the Antikythera wreck, the Lake Nemi ships, and the Yassiada ships. On the other hand, wrecks were omitted from the list unless there was some combination of the following information: size and dimensions of a vessel, approximate or known tonnage, approximate amount and type of cargo.

While the deliberate selection of examples may have skewed the trend that the list represents, given limitations of time and resources, this list is as encompassing as possible and I hope to revisit the subject in the future with more resources. Additionally, my survey sample of excavated ships may have been skewed on several parameters. First, a naturally occurring bias as the result of deposition towards larger vessels probably exists in the archaeological literature and therefore also my sample. Large ships and cargoes have higher likelihood of surviving as identifi-
able objects as consequence of the deposition and physics. The first reason for this is because the greater bulk of material could protect itself against current and other destructive forces. The second reason is that a larger mound of artifacts creates a greater profile and surface disturbance and was thus more likely to be spotted by divers or researchers. In contrast, smaller vessels and their correspondingly smaller cargoes were more likely to scatter and go unnoticed.

Classification base is one of the primary interpretative tools in the field of archaeology. Scholars have traced similarities and differences in manmade material with great success and have been able to deduce origin based upon these parameters. Watercraft, like any other artifact, can be classified in a bewildering variety of ways. The diversity of terminology is one illustration of this dilemma, however, the precise differences between a raft, a float, a boat, and a ship are topics for another paper, and that does not even consider the diversity of terms found in ancient Greek and Latin for the same spectrum of watercraft. One method has been grouping by type of buoyancy or the primary building material: skins, bark, wood, and even pots before the advent of iron and steel. Another traditional method of classification has been by function: merchant vessels, warships, fishing boats, and a catch-all category of utility craft. Classification can often be more of an imposition of typology by scholars than reflection of actual use reality, thus the ideal classification system is flexible, applicable, and something that reflects ancient conceptualization and approaches. All the ships discussed in this chapter were sailing merchant vessels made of wood, so we shall turn to characteristics that reflect the internal structural reinforcement of a vessel and the inherent philosophy behind them. A difference in construction approach can bee seen in wrecks that predate the Roman era, those that occur during it, and those that come from subse-

27 Bowens 18.
29 Houston 557.
30 Houston 558.
31 Hocker and Ward 2.
32 Hocker and Ward 3.
33 Hocker 3.
quent periods.

Mortise-and-tenon joinery was a common and widespread practice of shipbuilding in Mediterranean stretching back into the Bronze Age and likely originating in the Levant.\textsuperscript{34} This technique entailed inserting wooden pegs, or tenons, into fitted holes, or mortises, that ran along the upper and lower edges of each side plank. As a final step, a dowel was often inserted transversely through both the plank and the tenon to further secure the fit and join.\textsuperscript{35} The ultimate result of this method was that each strake was securely affixed to the adjacent planks above and below by several hundred double locking joints.\textsuperscript{36} The meticulousness of this method is underscored by Throckmorton in his explanation of the reconstruction of an ancient ship:

\textit{<It was> by modern standards outrageously wasteful of wood and labor (although both were cheap in antiquity), this meant that joining the entire shell of strakes edge to edge from the keel up to the cap rail, using closely spaced mortises and tenons locked with pegs, all before a single frame was adzed to fit inside that shell.}\textsuperscript{37}

The precise measurements and careful carving by shipwrights when constructing a vessel with mortise-and-tenon joinery placed much of the focus on construction of the hull of the ship. Vessels built in this fashion had extremely durable hulls with minimal internal reinforcement.\textsuperscript{38} Internal frameworks such as the keel and ribbing could be inserted later to fit the form, which the hull had taken, and add additional support. Hence mortise-and-tenon construction has been inherently linked with the classification of shell-first or shell-based construction, which posits that ancient boat builders crafted their hulls first and added keel and ribbing later. In contrast, most modern construction methods require naval architects to begin with the skeleton and then attach the hull planking around the internal framework. So while skeleton-based construction is the

\textsuperscript{34} Pulak 214.
\textsuperscript{35} See Appendix 1: Image 1
\textsuperscript{36} Hocker and Ward 23.
\textsuperscript{37} Throckmorton 56.
\textsuperscript{38} To date, no oared warship before the Byzantine period has been excavated. Scholars presume that during the classical and Hellenistic eras, oared warships were constructed in the traditional mortise-and-tenon fashion, but reinforced naturally by narrow dimensions and the internal structure of the rowers’ benches. Even so, such vessels were designed to be lightweight for speed; they were carefully and regularly maintained. These factors all allowed them to be built with the mortise-and-tenon approach even at larger sizes.
hallmark of modern naval architecture, shell-based construction was the approach used by many craftsmen up until the second and third centuries CE.\textsuperscript{39}

The earliest known phase of Mediterranean ships and shipping is represented by two ships from the Bronze Age. The Cape Gelidonya and Uluburun ships unmistakably demonstrate the shell-first approach with pure mortise-and-tenon construction elements. In the Cape Gelidonya wreck that was excavated by George Bass and his team in 1960, very few fragments of the hull survive, but those that do did include some treenails or wooden nails.\textsuperscript{40} Some surviving fragments are large enough to show square indentations, it is highly probably that these indicate the mortise-and-tenon method was used in construction.\textsuperscript{41} The ship was small, estimated at least one ton of cargo but not much more based on surviving cargo of metal ingots and scrap metal.\textsuperscript{42} Many of the finds are near eastern, such as the cylinder seal, indicating this small vessel followed a route that involved the Levantine coastline and extended up past Cyprus and southern Anatolia into the Aegean. Thus the Gelidonya wreck of circa 1200 BCE is a good example of early Mediterranean ship construction and likely followed a shipping pattern of frequent stops along the eastern coastline of the Mediterranean.

In the classical period, during the height of the Athenian thalassocracy, evidence shows that the mortise-and-tenon method was still in use. Many small wooden fragments were discovered in the Tektas Burnu wreck from the classical period; these fragments were mostly small and heavily damaged by corrosion, but nevertheless indicate mortise-and-tenon joinery.\textsuperscript{43} The Tektas Burnu wreck does have some indication of metal nails being used, but they were minimal and used not to supplant mortise-and-tenon joinery but to provide connection between hull and skeleton.

\textsuperscript{39} Not all vessels fit clearly into one category or the other because they are constructed in a hybrid method. This difficulty of mixed techniques is especially felt in finds from the first and third centuries CE, when a shift was occurring from construction that emphasized a strong shell to construction that relied more and more heavily on internal framework for structural support.\textsuperscript{40} George Bass, “Cape Gelidonya: A Bronze Age Shipwreck.” \textit{Transactions of the American Philosophical Society} 57, no 8. (1967): 49.\textsuperscript{41} Bass 51.\textsuperscript{42} Bass 50.\textsuperscript{43} Joel Jurgens and Robert Blanchette. \textit{Evaluating the Wooden Remnants of the Tektas Burnu Shipwreck}. (College Station. Texas A&M University Press, 1991), p 400.
ton components.\textsuperscript{44} It represents both a continuation of the earlier, pre-classical tradition of carpentry joints and the new advent of metal nails to connect hull to skeletal components.

The late classical Kyrenia Ship was excavated by Throckmorton \textit{et al.} in the late 1960s and 1970s and proves to be particularly valuable to the field because over 60\% of the hull was found intact. Dated to the last decade of the fourth century BCE, this Aegean merchant vessel also demonstrated the shell-first construction technique with tightly spaced mortise and tenon joints all along the strakes. The cargo consisted of several hundred amphorae, her carrying capacity estimated at a maximum of 25 tons, and length projected to be more than 13m.\textsuperscript{45} The completeness of the finds allowed Richard Steffy and a team to reconstruct the Kyrenia II vessel practicing this ancient method and confirm for the academic community the validity of the ancient shell-first method:

In effect, the absence of any fastening between the framing and the keel between the different framing elements (floor timbers and futtocks) responds to perfectly integrated planking in which the strakes are fastened to each other by tenons pegged in mortises and in which the wales are an integral part.\textsuperscript{46} Kyrenia demonstrates that some vessels in the shell-first method could reach larger sizes than previously estimated.

The famous Antikythera wreck contributes to this discussion, in spite of the less than scientific method of its excavation, if Throckmorton is correct in his assessment of the remains. He proposes that the wreck was from the late Roman Republic, attributing it specifically to the looting of Greek cities by the Roman general Sulla because the cargo included large quantities of fine sculpture and other treasures such as the mysterious Antikythera mechanism.\textsuperscript{47} His overall argument is sound, even if it is a stretch to attribute it so specifically to this one particular account. If correct, this estimation would place the ship’s demise in the 1\textsuperscript{st} century BCE. A few fragments of the ship’s hull survived and were excavated and preserved, although the majority was appar-

\textsuperscript{44} Jurgens and Blanchette 401.
\textsuperscript{45} Throckmorton 56.
\textsuperscript{46} Hocker and Ward 29.
\textsuperscript{47} Throckmorton 20.
ently lost either from natural degradation processes or negligence in the excavation. Those limited remains indicated to Throckmorton that the hull was likely constructed using the ancient mortise-and-tenon method. Thus the ship and the construction technique fit the timeline of development.\(^{48}\)

Two massive barges that were constructed by the Romans during the early imperial period have been found in Lake Nemi, a large inland body of water south of Rome.\(^{49}\) The ‘Lake Nemi Ships’ were known as early as the 1400s, but were inaccessible before the development of the dive-bell.\(^{50}\) Even then, the depth of the remains was too deep and the size of the vessels too large for any extensive excavation. In an impressive show of determination, the archaeologists under the government of Mussolini drained the water out of the lake so that the ships could studied.\(^{51}\) The hulls of these ancient Roman ships were massive and capable of holding several hundred tons, not of merchant cargo, but of architectural structures. The remains scattered around the site indicate that opulent palatial structures were erected on the decks of these vessels, including bath houses fitted with marble and precious metal decorations. Some scholars have posited that the two ships were ceremonial vessels for use in the cult of Isis which was favored by Caligula, but much of this is guesswork.\(^{52}\) Regardless of an association with a particular emperor or cult, these vessels were clearly magnificent floating entertainment facilities that necessitated robust hulls and masterful engineering.

Only parts of the lower hulls remained fully intact at the time of excavation, but unfortunately, both vessels were destroyed by fire in World War II. During their retreat from Italy, the German forces deliberately bombed and burnt many ancient sites, including these vessels. Although all of the wooden remains were turned to ash, a large quantity of metal survived the fire,

\(^{48}\) Throckmorton 21.
\(^{49}\) See Appendix 1: Image 2
\(^{52}\) Steffy 70.
and these scraps were predominantly nails used in the hull construction. In this case the number and size of the nails suggests that they were used to reinforce planking, rather than connect shell to skeleton.

They were not intended for use on the sea, but were built to use on the lake. Even so, they are built to the highest degree possible for Roman shipwrights. The barges were 70 m (200 ft) long and 18 m (60 ft) wide. They were built using the efficient mortise-and-tenon fastenings, with copper nails and lead sheathing along the hull.”

The extensive use of metal nails in the construction of these vessels, their location in central Italy, and their association with the early emperors all make it the most likely ancient ship-wreck to be directly associated with a particularly Roman way of construction ships. The massive size and tonnage of the vessels required additional structural supports beyond mortise-and-tenon construction and the use of nails to affix the hull planking to the internal framework. In this case nails further reinforced the planks themselves. Additionally, engineers under a time crunch, to produce such grandiose structures during an emperor’s lifetime, would have needed to choose a method that was quicker and demanded less skill than the traditional mortise-and-tenon joinery.

Two vessels have been excavated off the Turkish promontory of Yassiada, one from the fourth century CE and the other from the seventh century CE. The fourth century wreck has more active skeletal system built in, thus departing from the older shell-first principle and moving into the skeleton-based designs. The seventh century wreck demonstrates an equal mix of skeletal and shell elements, the mixture indicating that emphasis was becoming thoroughly mixed. Moreover, in the latter wreck, the points of connection change depending which part of the hull is being discussed, the lower portion showed much more active internal ribbing, whereas the upper gunwales retained more of the mortise-and-tenon construction; thus allowing the foundation of the hull to be strong and reinforced, while the uppermost portions were lightweight and more

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53 Steffy 72.  
54 Hocker and Ward 32.  
55 Hocker and Ward 33.
flexible.\textsuperscript{56}

In conclusion, when one compares evidence from shipwrecks of different time period, a series of trends emerges and scholars can trace the trajectory from shell-based to skeleton based construction. These chances are paralleled by evolving styles of connecting side planks as well as the gradual incorporation of metal nails to clinch connections. With additional internal support made possible by metal nail connections and increased ribbing, ships could be built larger. Larger ships could carry greater amount of cargo and handle rougher weather conditions. There is no way to determine the exact reasoning behind such changes, but it would seem that the gradual development of hull construction was pushed by desire to have more effective cargo vessels.

\textbf{Anchors}

Beyond the study of shipwrecks themselves, other underwater artifacts and sites can be studied to provide additional evidence for ancient maritime culture. Anchors are second to ships themselves in terms of what they contribute to our understanding of shipping practices. They are frequently found, both in the context of wreck sites and in isolated deposits; sometimes stone anchors were repurposed as building material in coastal villages and harbor construction. Secondly, anchors became a symbol of steadfastness and permanence and as a result they are often used in nautically themed art or referenced in literature. Thus, many literary and art historical accounts can corroborate a timeline for the development of anchors in a manner that isolated archaeological finds cannot. By tracing the change and development of anchor technology, one can simultaneously understand the changes in size of ships and their docking, mooring, or weathering habits.\textsuperscript{57}

Some of the earliest known anchors were large stone anchors, with one or more holes drilled for the hawser of the anchor line to be looped through; these were most likely first used by

\textsuperscript{56} Hocker and Ward 33.
\textsuperscript{57} See Appendix 1: Image 3
Such stone anchors used their weight and mass in the physics of displacement to counteract the movement of the boat; therefore the weight of the anchor was directly related to the size of the ship that carried it. Anchors at Uluburun and Cape Gelydonia were made of stone in this fashion. Similarly, large stone anchors found together with isolated cargoes off the coast of Israel each weigh up to 250 kg. Later stone anchors had additional, smaller holes drilled into their bases for the attachment of spiked wooden prongs, which would anticipate hooked anchor designs. Such spikes or prongs provided additional stability by digging into the sea bed for resistance rather than relying on weight alone.

Round or semi-rectangular stone anchors were used from the Bronze Age through the classical era, when they began to be replaced by wood and stone, or wood and metal hooked designs. Sponge divers often sought out ancient wreck sites, because they might contain bars of lead, which could be used as dive weights or sold for a profit. What they failed to understand was that those lead bars were in fact the remnants of ancient anchor stocks. The Tektas Burnu ship of the classical period had a wood anchor fitted with metal bars. At Lake Nemi, two anchors were found: the first was 5m long and made of a combination of lead and wood and the second was made of iron and was 4m long. Roman ships carried a quantity of lead stocker wooden anchors, but in the second century they were being replaced with solid iron anchors. Metal anchors could resist the corrosive and destructive properties of the salt water for much longer than wooden anchors. Hooked anchors could fix the movement of larger vessel with less weight because of their design and physics; hence the gradual evolution in part reflects an increase of vessel sizes over time, and the fact that anchors become large, iron, hooked designs in the second

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59 Misch-Brandi 12.
60 Misch-Brandi, 11
62 Throckmorton 20.
63 Steffy 71.
64 Deborah Carlson. “Caligula’s Floating Palaces.” *Archaeology.* May 2002, 27
65 Carlson 30.
century CE indicates that the size of ships in this era necessitated a more dependable device for mooring.

The average size and abilities of ships was directly related to the corresponding size and capacities of the docks and ports that lined the Mediterranean littoral.\textsuperscript{66} Smaller vessels tended to hug the shore line and trade a small amount of merchandise from site to site, resulting in a hodge-podge cargo. Many of the larger vessels carried single commodities, like grain, or a diverse collection of goods a longer distance. Thus mega ports existed, as did the gigantic ships for the transportation of grain.\textsuperscript{67} When the ships are smaller and they trade short to medium distance then the cargoes tend to be more diverse collection of items, originating in different ports and at various weights and amounts. The literature to date has “justifiably noted that our evidence does not permit us to establish an average size for ancient merchant vessels, and they have therefore concentrated on establishing the probable size of the larger and or largest vessels.”\textsuperscript{68} Still, the catalog of shipwrecks indicates that vessels tended to become larger during the early empire than they had been previously. The ships which transverse the Red Sea and Indian Ocean were certainly built larger to maximize cargo capacity as well as to aid in weathering rough seas. As we follow the development of ships throughout the ancient Mediterranean, it becomes apparent that their tonnage increased over time, reaching exceptional size during the Roman Empire.\textsuperscript{69}

In addition to large seaports becoming prominent within the Mediterranean during the early empire, maritime commerce also extended into the English Channel, the Red Sea and the Indian Ocean. Weather conditions in the north Atlantic are more challenging than most parts of the Mediterranean, some of wave and winds there develop in the open Atlantic and the area is significantly more tidal. Presumably then, some of these structural changes came about as a response to the risk and difficulty of shipping expensive merchandise. Larger ships are able to sus-

\textsuperscript{66} Houston 553.
\textsuperscript{67} Houston 554.
\textsuperscript{68} Houston 553.
\textsuperscript{69} Misch-Brandi 57.
tain more powerful winds under sail and have less chance of swampy in heavy seas. Likewise, robust, durable ships are able to tolerate support and gird larger vessels being put through especially rough storms in the English Channel and Indian ocean.

In conclusion, the progression of ship construction method, cargo capacity, anchors, and ports suggests that the nature of seafaring evolved at an accelerated rate during the first centuries of the Roman Empire from a tradition that had dominated for almost a thousand years into a style reminiscent of modern shipping practices. The changes began gradually with the increased use of metal nails to join planking to fix keel and ribbing to the shell, then nails began to replace wooden tenons in plank seams, and eventually the finely crafted mortise-and-tenon joints were phased out of use in the late roman period. As Richard Steffy noted, the transition from shell-based construction to skeleton based construction appears to have occurred during the Roman era. Whether the Romans had a unique maritime culture, it appears that a larger, more universal maritime culture existed. Additionally, the evidence suggests that many features of maritime technology are directly related to maritime culture and regional economics. The size of ships influences the distance and routes they can travel. The distance and route determines location of port facilities and style of trade, either short distance with many small commodities or long distance with a single commodity. The size of a ship also determines the type of anchor used, which in turn is related to docking in harbor and port facilities to take on cargo. With all these features interrelated, it is easy to understand how changes in the political and economic environment of the ancient world would have also affected all of these elements.

70 Hocker and Ward, 6.
Chapter 2:
Roman Attitudes Towards Seafaring as seen in History, Literature, and Law

Introduction

No study of technology in the ancient world would be complete without simultaneously investigating how a particular society engages with ‘technological advancement.’ In order to understand the larger societal attitudes toward maritime activities, scholars must supplement the study of material remains with the review of ancient laws and literature. Did the Romans embrace technology by seeking out more effective tools and readily accepting improvement, or did they resist technological changes and maintain conservative traditions? To what degree did the Romans have active agency in changing the ways ships were constructed? To address these questions, first I would like to draw your attention to one of the most iconic ruins in Rome. The technological marvels of the Roman Empire are impressive even to a modern audience, one need look no further than the eternal city itself for the greatest examples of ancient technology. There, nearly two thousand years after its construction, the Flavian Amphitheater, commonly known as the Colosseum, looms as large as many state-of-the-art stadiums built within the last decade.\(^\text{71}\)

Post holes along the upper exterior of the structure indicate that amphitheater could be covered with a canopy made from the same material and rigging used on sailing vessels. Here, a fundamental aspect of maritime technology that helped convey goods to and from Rome also protected the audience from the hot Mediterranean sun. Additionally, one of the many grand specta-

\(^{71}\) For the sake of comparison, the Cowboys Stadium in Arlington, Texas, currently holds the distinction of being the world’s largest domed stadium as well as having the largest un-columned interior space. The facility was completed in 2009 at the cost of $1.3 billion and seats up to 80,000 spectators, whereas the Colosseum’s maximum capacity was estimated somewhere between 50,000 and 80,000 spectators.
cles that the Romans conducted inside the massive walls of this structure were *naumachia*, or mock naval battles. Therefore, both waterproofing techniques on a large scale and actual ships enhanced the setting of select performances. These exceptional examples serve as an appropriate launching point for a discussion of Maritime technology during the Roman Empire, because both aspects of this public entertainment venue *par excellence* displayed contemporary maritime technology. The canopy was especially significant because it was massive, clearly visible, and fulfilled a key role in the functionality of the venue, yet it was ancillary to other aspects of the amphitheater that the ancient Romans and modern scholars prefer to focus on. This represents the complicated relationship and the same could be said for so much of Roman maritime activity which had an ubiquitous presence underpinning the economy, but was often given little or negative attention.

Rome was positioned to either abstain from seafaring activities if it so chose or to become an active player in Mediterranean trade. The geographic location of the city and the historical time frame in which it rose to prominence have marked advantages and disadvantages towards an inclination towards maritime activity. On the one hand, many voices from Roman culture denounced the practice of seafaring as greedy and dangerous, but on the other hand, the Roman empire had relied heavily on staples imported through Ostia. While most of these indicators suggest an inward, landward focus rather than an outward orientation to the sea and seafaring, the maritime culture of the entire Mediterranean Sea basin shifted during the first centuries CE as a result of imperial activity. In reality the ancient Romans ended up balancing the two distinct approaches. A review of Roman geography, history, literature, and law all demonstrate the uneasy vacillation between embracing and rejecting maritime affairs by the Romans.

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72 The *naumachia* were rare and it is debated whether they took place in the same scale inside the Colosseum. Textual evidence comes from Tacitus, *Annales*, XIV, 6, 1 and Dion Cassius LXI, 12.2. The Colosseum was built directly on top of a large artificial lake of Nero’s palace complex, so it is entirely possible that the hydraulic engineering to flood the area was already in place.
The conflicted nature of the Roman relationship with the sea can be traced alongside a history of their naval forces and involvement in maritime commerce. According to its mytho-history, Rome was founded in the 8th century BCE, almost a thousand years after the boom in maritime transshipping that occurred in the Bronze Age Levant. This timing would put Rome behind the game if we consider the longstanding traditions in the eastern Mediterranean and the highly competitive environment that existed on the sea during the period of Phoenician and Greek colonial expansion, Etruscan and Carthaginian domination of trade and piracy, and the emergence of the thalassocracy in places like Athens. Both the location of Rome, however, and its tradition of abstaining from maritime activity during its early history put Rome in a position to eventually overcome such hurdles. By waiting several centuries, Rome expanded its land holdings in a manner that gave it greater access to resources, technology, and manpower when it did begin to compete for a place on the sea.

In the earliest centuries, the Romans seem to have had an outright aversion to ships and seafaring; they largely refused to participate in seaborne activities. Then in the third century, that attitude shifted quickly, if temporarily, to a wholehearted embrace of naval power when it became necessary to defeat the Carthaginians. The generations immediately after the Punic Wars are marked by abandonment of the state’s naval pursuits. This in turn created a power vacuum that led to an increase in piracy, which necessitated an extensive campaign in the last decades of the Republic to confront the growing problem. Then the Battle of Actium, one of the few major naval battles of the Roman Empire, concluded the civil war between Antony and Octavian. After Actium, the emperors established a permanent naval force, but its role was reduced to that of an auxiliary force until the Empire began to dissolve in the fifth and sixth centuries. During the early empire, naval activity may have stopped or been greatly reduced, but merchant activity increased

73 The foundation mythology featuring Aeneas, the prince who led an expedition of Trojan refugees wandering throughout the Mediterranean by sea in their search for a new homeland, may indeed presume that the predecessors of Rome brought maritime technology with them from Asia; however, this myth was made canonical by Virgil during the Augustan era, when Rome was opening up to the idea of maritime activity.
dramatically. A chart of known shipwrecks from antiquity demonstrates that there was a clear spike in the number of vessels that traversed the Mediterranean during this period.74

**Geographical Location**

The development of Rome, and any culture for that matter, was greatly dependent upon local ecology, resources, and relative location. Ecology determined available resources. The juxtaposition of different cultures was also dependent on location and geography, but shifted over time as cultures spread, condensed, collapsed, and emerged. This relative location determined the degree to which there was competition between groups for scarce resources or opportunity for exchange of specialized products. While Horden and Purcell point out that cultural connections were not wholly defined by geography because of the interconnectivity possible by trade on the Mediterranean Sea, they still maintain that the spread of culture and technology does have an underlying geographic logic.75 The placement, therefore, of Rome in both space and time had a profound affect on Rome’s role in world history.

Rome was built on the eastern bank of the Tiber River about 25 kilometers from its opening into the Tyrrhenian Sea. This deliberate choice of location gave the ancient city - or town at that time - a set of natural advantages. Rome was situated at the convergence of a few different microregions and therefore a diverse set of natural resources. The river itself was the major resource; it provided water, food, transportation, irrigation, and defense. This location was far enough inland to indicate that access to the sea – while possible – was not a primary concern. Utilization of this potential access to the sea would be a later phenomenon and is physically indicated by the construction of the Roman satellite city and port facilities at Ostia. Rome’s location on the Tiber then places the city into Ian Morris’s paradigm of river cultures, rather than sea cultures.

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74 See Appendix 1: Image 4
75 Horden and Purcell 110.
The region of Italy where Rome is situated naturally encourages a disposition towards the west and the sea. The Apennine Mountains that run down the center of the Italian peninsula separate western Italy from the eastern coastline by difficult, mountainous terrain. Thus the geography itself forces a western orientation. The Tyrrhenian Sea is fractured off from the rest of the Mediterranean Sea by a framework of land-masses. The iconic, boot-shaped peninsula frames the eastern shoreline. The narrow strait between eastern Sicily and the south-western promontory of the Italian peninsula forms the southern boundary of the sea and a choke point easily controlled by cities located on either side. The large islands of Corsica and Sardinia enclose the sea along its western frontier. And finally the littoral of southern Europe demarcates the northern boundary. Although connected to the larger Mediterranean in overall climate and certain entrances to the West and South, this body of water was simultaneously separated and isolated by the inherent geography.

The region of Italy where Rome is situated may be considered the Western frontier of the Mediterranean during the Iron Age, as merchants pushed outside of the highly developed trade network that had been concentrated around Greece, the Aegean islands, the Levant, and Egypt since the Bronze Age.\textsuperscript{76} Evidence of contact between the eastern Mediterranean and early Etruscans exists in the Homeric writings of the 7\textsuperscript{th} century BCE and Phoenician settlements as far west as Spain centuries earlier, but it was during the 9\textsuperscript{th} century BCE that Italy began to be incorporated into this tradition of cross-cultural maritime trade. Additionally, in the eastern Mediterranean major urban centers had been active for centuries before Greek and Phoenician colonies began moving into Sicily and Italy, where the population centers were fewer and smaller in scale. We know, moreover, of no well-developed or widespread writing system in Italy before Etruscan, which was itself adopted from interaction with the Phoenicians and Greeks, that would provide corroborating evidence of the peoples that inhabited the region. Thus the Tyrrhenian Sea might

\textsuperscript{76} Wachsmann 57.
have been a natural, controlled environment for the early Romans to develop their own maritime culture had it not been for the prominence of their neighbors.

**Etruscan, Greek, and Carthaginian Influences**

A discussion of the Etruscans and their maritime practices must preface any discussion of Roman maritime history. The height of Etruscan civilization from the eighth through fifth centuries BCE coincided with a period of intensified trade and piracy in the Tyrrhenian Sea. Although historical accounts about the Etruscans are limited, those that exist all indicate that the people of Etruria were very active in maritime activities, specifically trade and piracy, which were defining features of their economy. So long as the Etruscans controlled the Tyrrhenian Sea they flourished, but as their hegemony declined, so did their prominence in maritime activity. By reviewing a history of Etruscan seafaring, we simultaneously see the other major competitors for maritime dominance – namely the Greek city-states, their colonies, and the Carthaginians – as well as the economic, political, and military tensions in the region.

Etruria was located along the new Iron Age trade routes and was sitting on an abundance of mineral wealth; these factors and others quickly drew them towards the sea and seafaring, unlike the earlier, little-known Villanovan culture. Sherrat in his article comments on the connectivity of the Etruscans through maritime trade and how that distinguished them:

> It is unhelpful to an outside reader to be told that Cycladic or Etruscan culture was autonomous, except to dispel the outdated myth that either of them was transplanted ready made from Asia Minor; clearly both were made possible by a conjunction of circumstances which included the existence of urban trade networks in the east Mediterranean as well as flourishing local economies and contacts with an adjacent hinterland. What distinguished Bronze Age Melos or Iron Age Etruria were their positions in relation to movements along routes which brought exceptional opportunities by comparison with contemporary communities elsewhere in Europe.  

Involvement in the larger spectrum of Mediterranean trade corresponded to a certain level of connectivity, which therefore made certain cultures become better known in proportion with their involvement.

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77 Sherrat 2.
Etruscan sea captains were able to establish a successful mercantile empire in the western Mediterranean, which in turn brought them into conflict and contact with other peoples competing for this trade. The Greeks of southern Italy had a vested interested in maintaining control of sea routes to and from mainland Greece, as well as expanding supply routes into the western Mediterranean. The conflict between Etruscans and the Greek colonists appeared in the literature in the form of Etruscan piracy. The seventh Homeric Hymn dedicated to Dionysus gives a brief tale of ‘Tyrsenian Pirates’ taking the god hostage and then contemplating holding him for ransom:

...τάχα δ’ ἄνδρες ἐνσέλμου ἀπὸ νηὸς
ληστάι προγένοντο θοίδος ἐπὶ οἴνοσα πόντον,
Τυρσηνοὶ...

Many scholars have identified the Tyrsenians mentioned here with the Tyrrhenians of Etruria, based on the similarity of the names and the stereotype the Greeks had of the Etruscans as pirates. Indeed, there is a great deal of similarity in the names. Slight variation in the nomenclature would not come as a surprise given that many of these early encounters between the Greeks and pirates in the Tyrrhenian Sea seem to have been hostile and limited. The term “Tyrsenian” occurs only one other time in extant Greek literature and that is in Hesiod’s *Theogony*. The passage is brief and tangential: ... μάλα τῆλε μυχῷ νήσων ἱερῶν / πάσιν Τυρσηνοῖσιν
ἄγακλετοῖσιν ἄνασσον (all the famous Tyrsenians, far away in the corner of the sacred islands.)

This usage too, however, indicated an association between the ‘Tyrsenians’ and maritime activity. In a later passage by Strabo, Etruscan seafaring continues to be characterized by the Greeks in a negative manner:

Τούς γὰρ πρότερον δεδείναι τὰ ληστήρια τῶν Τυρρηνῶν καὶ τὴν ὁμότητα τῶν ταύτη βαρβάρων, ὡστε μηδὲ κατ’ ἐμπορίαν πλεῖν.

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78 The Homeric Hymns 7.8-12.
79 Hesiod: *The Theogony*, 1015.
80 Strabo 6.2.2
In ancient history and mythology, we can see a commonly espoused notion that much of early Italy’s maritime culture was brought there from the East. Herodotus posits Lydia as the possible origin of the Etruscans. While prefacing the rise of King Croesus of Lydia, he attributes the massive migration of peoples from Anatolia into the Italian peninsula to severe famine.\(^{81}\) A similar account from Strabo echoes Herodotus’s theory of Etruscan origins, although the similarities were likely the result of Strabo getting his information directly from Herodotus.\(^{82}\) These two traditions imply a continuity and transmission of maritime technology from the east to the west, therefore linking the Etruscans into the larger Mediterranean traditions of seafaring. The story of Aeneas, which Virgil made canon in his epic the \textit{Aeneid}, also suggests the same underlying movement of peoples and technology.

Two naval battles occurred near the end of the Etruscan domination of the sea that precipitated their decline.\(^{83}\) The first was the battle of Alalia (circa 535 BCE), which occurred after a new Greek colony that was founded in eastern Corsica began threatening Etruscan and Carthaginian interests in the region. Herodotus’s account of the battle indicated that after great losses on both sides the combined Etruscan and Carthaginian forces were defeated.\(^{84}\) The second incident was the Battle of Cumae when Etruscans were routed by Hiero of Syracuse.\(^{85}\) The Etruscans used naval power to support their commercial interests, but these two losses within a few generations significantly hurt their maritime supremacy. After this period we begin to see the rapid decline of Etruscan influence. Meijer summarizes this transition from early dominance of the sea to the waning of Etruscan power as sites in Magna Graecia and Sicily gained prominence.

\(^{81}\) Herodotus 1.94.2. 
\(^{82}\) Strabo, 5.2.2. 
\(^{83}\) The Etruscans at this time had a trade and military alliance with the Carthaginians. Aristotle specifically cites this alliance between Etruria and Carthage in his \textit{Politics}: And if its object is not military alliance for defense against injury by anybody, and it does not exist for the sake of trade and of business relations—for if so, Etruscans and Carthaginians and all the people that have commercial relations with one another would be virtually citizens of a single state; at all events they have agreements about imports and covenants as to abstaining from dishonesty and treaties of alliance for mutual defense. Trade and business transcended political boundaries in ancient times just as they often do today. (Aristotle, \textit{Politics} 3.1280.a.) 
\(^{84}\) Herodotus 1.165.1. 
\(^{85}\) Thucydides 7.53.2.
The Roman attitude towards navigation strongly contrasts with that of the Etruscans, with whom the Romans came into contact at an early stage and who in the sixth century BCE dominated them. At that time the Etruscans had risen to a leading position at sea. Their thalassocracy in the area of the Tyrrhenian Sea resulted in military expeditions sometimes extending as far as the Aegean, which got them in Greek eyes the reputation of being pirates. When in the beginning of the sixth century BC the Phocaeans appeared and the Greeks discovered the routes to the west, the situation changed in that the Etruscan monopoly was threatened. They formed an alliance, both military and economic with the Carthaginians. A confrontation between the allied forces of Etruria and Carthage and the Phocaeans took place in 535 BCE at Alalia. Though the Greeks were victorious in this close battle the Etruscans remained masters of the Tyrrhenian. This thalassocracy was ended c. 60 years later in the Battle of Cumae (c. 465 BCE).86

The rise and fall of Etruscan civilization was directly correlated to their dominance of the Tyrrhenian Sea. Much of their economy and social hierarchy was based on maritime activity and thus during the period of Etruscan hegemony in the region, the land-locked city of Rome would have been forced to compete with the wealth, power, influence, and maritime accomplishments of the Etruscans.87 Meanwhile, the Carthaginians and Greek colonies of southern Italy, Corsica, and especially Sicily were contending with the Etruscans; this resulted in a highly competitive environment in the Tyrrhenian Sea. This left a small city like Rome little recourse in competing with the maritime powers of the region save to avoid seafaring altogether and focus on land pursuits – which the Romans would come to excel at. Being surrounded by peoples with expertise in seafaring must have made it inadvisable and unproductive for the city of Rome pursue maritime activity given her disadvantageous position of limited experience.

The Romans would nevertheless gain much knowledge from their predecessors and contemporaries. Etruscans, colonial Greeks, and the Phoenician Carthaginians all had inherited several hundred to a thousand years of technical knowledge of ships, navigation, weather, and warfare from their eastern counterparts. The Romans too would adopt from the Etruscans, Greeks, and Carthaginians, by either hiring these peoples to man their ships or by directly copying their boat construction. Language reveals the adoption of Greek practices; the Latin term navis used

87 Meijer 148.
generically for “boat” is a borrowing from the Greek Ναῦς, indicating a borrowing at least on the cultural-linguistic level.

**History**

Roman maritime activity first begins to appear in the historical record during the Republic. Here it is most fruitful to study Rome’s direct involvement in seafaring in terms of specific battles and treaties. While such events may be considered merely ‘surface disruptions’ and not the underlying current of human history, they allow the scholars to pinpoint moments of change. Such instances are also a necessity in the study of ancient history, because the scarcity of data and the absence of modern ‘accuracy’ in the ancient historical records limits information on demographic trends. Rome began to emerge as a power in the fifth century BCE with its territorial spread through adjacent areas of Italy. The city sent out veterans to found colonies, most ranging in size from several hundred to several thousand men, and it was common for them to locate themselves along the coast or along rivers at strategic locations. Moreover, the Roman practice of letting conquered cities become allies and operate with relative autonomy gave Rome further reach with minimal expenditure of its own manpower. The expansion inherent in these two practices brought the Romans into contact with the coastal cities of Magna Graecia, whose economies depended upon maritime trade. Further extension of Rome’s control over the Italian states put her in increasing contact with the major maritime powers of the third century BCE, especially Carthage.

Carthage was founded in North Africa as a Phoenician colony in the ninth and eighth centuries BCE, but quickly grew into a powerful and prominent city in its own right. Carthage focused on developing a commercial empire and defined its trade routes with naval power, hiring foreign mercenaries to attend its land wars. A large navy was developed to protect the merchant fleets, as evidenced by the excavations of the large man-made port facilities and ship-sheds of the inner and outer harbor at Carthage. As an economic empire, the Carthaginians also became active
in colonialism during this period, and pursued coastal sites as commercial contacts – emporia in Etruria and Sicily were of particular interest.\textsuperscript{88}

The relationship between Carthage and Rome would largely be remembered as hostile; however, before the first Punic war, Rome was engaged in treaties with Carthage. These early documents reflect the different strategies of the two polities, especially the seemingly apathetic attitude the Romans exhibited toward seafaring. An account by Polybius loosely cited the first treaty and placed it sometime around 509-508 BCE.\textsuperscript{89}

\begin{quote}
Ἐπὶ τοῖς δὲ φιλίαν εἶναι Ῥωμαίοις καὶ τοῖς Ῥωμαίοις συμμάχοις καὶ Ῥωμαίοις καὶ τοῖς Καρχηδόνιοις καὶ τοῖς Καρχηδόνιοις συμμάχοις: μὴ πλέξει Ῥωμαίοις μηδὲ τοῖς Ῥωμαίοις συμμάχοις ἐπέκεινα τὸ Ἐκλογον ἰκρωτηρῖον, ἡν μὴ ὑπὸ χεί. Μῶνος ἢ πολεμίων ἀναγκασθῆσαι: ἐὰν δὲ τὸ δὰ κατενεχθῇ, μὴ ἔξεστο αὐτῷ μηδὲν ἀγοράσειν μηδὲ λαμβάνεις πλὴν δοσα πρὸς πλοίου ἐπισκεφθεῖν ἢ πρὸς ἵππα, ἐν πάντε ἐν ἡ ἡμέραι ἀποτεθέντο. Τοῦ δὲ κατ’ ἐμπορίαν παραγιγνομένοις μηδὲν ἐπο τέλος πλὴν ἐπὶ κήρυκι ἢ γραμματεῖ. Ὡς δὲ ἄν τούτον παρόντων πραθῆ, δημοσία πίστει ὀρθελέσθω τῷ ἀποδομένῳ, δοσα ἂν ἢ ἐν Λιβύῃ ἢ ἐν Σαρδών πραθῆ. ᾖν Ῥωμαίοι τὶς εἰς Σικελίαν παρὰ γίνεται, ὣς Ῥωμαίοις ἐπάρχουσιν, ἵσα ἐπο τῷ Ῥωμαίοις πάντῃ. Καρχηδόνιοι δὲ μὴ ἀδικεῖτοσαν δήμον Ἀρδεατόν, Ἀντιατόν, Λαρεντίων, Κικαια τῶν, Ταρρακιντών, μηδὲ ἄλλον μηδένα Λατίνων.\textsuperscript{90}
\end{quote}

The Romans, or at least their allies, must have been engaged in some maritime traffic in order to necessitate such a limitation on the range and the scope on which they could trade. It was, however, likely predominantly allied cities rather than Romans, and when it was the Romans themselves, not extensive. The language of the treaty suggests that Carthage was more concerned about Roman merchants competing in the same ports than about Roman warships attempting to control the same waterways. This is underscored by the clause which required Roman merchants to go through official channels to participate in the local markets, thereby keeping trade limited and controlled, minimizing losses to Carthaginian revenue. This passage then indicates two things: Roman maritime activity was limited and primarily mercantile.\textsuperscript{91}

\textsuperscript{88} Throckmorton 53.
\textsuperscript{89} Polybius 3.22.4-13.
\textsuperscript{90} Polybius. 3.22.4-13.
\textsuperscript{91} The ambiguity between merchant transactions and naval activity here is highlighted; the nature of the ships are not specified, but assumed. It would be unsurprising if merchant vessels were the only active, and therefore threatening, Roman ships in the area. There was little to no need for military vessels, given the
While the conditions outlined in the treaty curtailed the Romans from maritime activity in the region, they simultaneously constrained the Carthaginians from mustering troops on land and establishing a military stronghold. Scholars have pointed out that these conditions aptly suited the interests and cultural practices of each city-state respectively. The conditions reflected divergent imperial strategies, which in turn echoed the land-based culture of the Romans on the one hand and the merchant marine culture of the Carthaginians on the other. Over time, however, the Roman expansion throughout the Italian peninsula changed their dynamic with the sea in such a way that war with Carthage over sea routes became inevitable. The Roman republic was primarily concerned with expanding its land holdings, and this terrestrial emphasis expanded Rome’s territory to the coastline in order to control the strategic access points to waterways. Thus Rome’s early involvement was less concerned with the opportunity for trade and more about the control of resources.

It is unknown how many such treaties existed between the two states, perhaps three or four. At least one other treaty followed later that supported the earlier arrangements and focused on maritime activity that was economic in nature. A shift occurred that revealed a change of focus from economic to military strategy in the final treaty in 279 BCE, which outlined the terms on which the two cities might fight Pyrrhus together. The agreement therein stated that Rome would contribute its land forces, while Carthage provided naval support and troop transport. Thus, while the first two treaties focused on trade, the third was clearly a reflection of military positioning. The juxtaposition of the forces of these two city-states foreshadowed the conflict to come.

Rome and Carthage fought a series of three long and bitter wars. The First Punic War

lack of coastal holdings, and Rome’s army could travel by foot through the central part of the peninsula rather than relying on conveyance by ship. Rome’s early lack of navy was sensible if one accepts the premise that the purpose of naval warfare was to control trade and safeguard maritime interests.

93 Warry 5.
94 Warry 5.
(264-241 BCE) began as result of competing interests in eastern Sicily, which was a significant location in the overall maritime trade of the Mediterranean Sea. The Mamertines first requested help from Carthage in its conflict with Syracuse; who obliged and set up a permanent base in the area. Then they subsequently requested assistance from the Romans to drive out this Carthaginian garrison. The proximity of that Carthaginian military garrison to the Italian peninsula and Rome’s holdings was threat enough to draw the city into naval warfare. In order to reach Sicily, and to contend with the Carthaginian supply ships that could support enemy troops, Rome was at last forced to create a fleet.

Naval warfare was to play a crucial role in the history of Rome during the third century BCE. The Romans built and fought with a navy in spite of having virtually no prior naval tradition. Polybius gives us a summary of the daring and risk that characterized this shift in policy:

Tὸν δὲ ναυπηγόν εἰς τέλος ἄπειρον ὄντων τῆς περὶ τὰς πεντήρες ναυπηγίας διὰ τὸ μιθέον τὸν κατὰ τὴν Ἰταλίαν κεχρήσθαι τοιούτους σκάφεσιν, πολλὴν αὐτοὺς παρεῖχεν τοῦτο τὸ μέρος δυσχέρειαν. Ἐξ ὑπὸ καὶ μάλιστα συνίδοι τις ἂν τὸν μεγαλόφυγον καὶ παράβολον τῆς Ῥωμαίων αἱρέσεως, οὐ γὰρ οἶνον εὐλόγους ἀφορμὰς ἔχοντες, ἀλλ’ οὐδ’ ἀφορμάς καθίσαξας οὐδ’ ἐπίνοιαν οὐδέποτε ποιησάμενοι τῆς ταλάντης, τότε δὴ πρὸς τὸν ἐν νῷ λαμβάνοντες ὀοῦτος τόλμηρος ἐνεχείρησαν ὡστε πρὶν ἢ πειραθῇ τοῦ πράγματος ἐνθετοῖ τοὺς προγόνους ἔχουσι τὴν κατὰ τὰ ἑτατον ἡμερομίαν ἀδήριτον. Μαρτυριών δ’ ἂν τις χρήσατο πρὸς τὴν ἄλλην τὸν νῦν ὑπ’ ἐμοῦ λεγομένου καὶ πρὸς το παράδοξον αὐτῶν τῆς τολμής; ὅτε γὰρ τὸ πρὸς τὸν ἐπεχείρησαν διαβιβάζειν εἰς τὴν Μεσσηνίαν τὰς δυνάμεις, οὐχ οἶνον κατάφρακτος αὐτοῦς ἐπήρησαν ναυς, ἀλλ’ οὐδ’ καθόλου μακρὸν πλοῦν οὐδ’ ἔμβος οὐδ’ εἶς, ἀλλ’ ἐναρὰ Ταραπτίνων καὶ Λοκρῶν ἠτ’ Ἐλεατῶν καὶ Νεαπολίτων συγχρησάμενοι πενητοκόρους καὶ τρίες ἐπὶ τοῦτον παραβόλον διεκόμασαν τοῖς ἄνδρας. Ἐν ὃ δ’ ἐκατὲρ τὸν Καρχηδονίων κατὰ τὸν πολέμον ἐπαναληθεύουσαν αὐτοῖς, καὶ μᾶς νέως καταφράκτου διὰ τὴν προθυμίαν προπεσοῦσας, ὥστ’ ἐποκείλασαν γενέσθαι τοῖς Ῥωμαίοις ὑποχείριον, ταύτη παραδείγματι χρώμον τότε πρὸς ταύτην ἐποιοῦστο τὴν τοῦ παντὸς στόλου ναυπηγίαν, ὡς εἰ μὴ τούτῳ συνέβη γενέσθαι, δῆλον ὡς διὰ τὴν ἀπειρίαν εἰς τέλος ἂν ἐκελ. 

Rome used a wrecked Carthaginian ship as the model for the fleet; they literally copied the Carthaginian blueprint. This demonstrates that there was no technological development of their own in construction technique or hull dimensions, but a wholesale borrowing of the preexisting design. Roman naval victory, however, was mainly the product of tactical innovation. From the out-

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96 Polybius I. 20. 10-16.
set, the Romans renounced the traditional ramming maneuvers and concentrated on boarding tactics, which would permit them to fight the largely unarmed crew of enemy vessels in hand-to-hand combat. The device the Romans came up with to get their marines onto enemy ships was the *corvus*, so called for the resemblance to a crow’s hooked beak. The *corvus* was essentially a long boarding ramp, hoisted upright with pulleys on the deck of the ship, with a sharp metal prong at the end which would lock onto the enemy vessel when the whole unit was dropped. This device, and the tactics that went with it, allowed the Romans to carry decisive naval victory against the Carthaginians at Mylae in 260 BCE. This novelty bought the Romans time until luck and experience gave them equal footing in subsequent naval contests. Throughout the Punic Wars, however, the Romans would continue to loose entire fleets due too their unfamiliarity with the sea; reefs and storms likely took as many if not more ships than the enemy.

After the First Punic War, the Romans practically disbanded their navy and would maintain sporadic involvement in naval activities as circumstances demanded until the late republic and early empire. Certain campaigns, especially those in northern Gaul and Britain, required naval efforts, as highlighted by Julius Caesar’s struggles against the Venetii. This very reversion from naval activity during the period after the Punic Wars, coupled with internal strife, led to a period of increased pirate activity on the sea. Certain key historical figures from the late Republic and their campaigns indicate the nature of the Roman relationship with seafaring during this period. In particular, Pompey augmented his already successful military background by interrupting piracy in and around Roman waterways. Pompey’s fame and prosperity in part resided in this successful eradication of the piracy problem that plagued certain regions during the first century BCE.

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97 See Appendix 1: Image 5
98 Polybius 1.23.3 and Livy Epitomie, 17.2.
99 Casson 177.
100 The issue of piracy in antiquity is a broad, complex topic, for the purposes of this paper I will limit my discussion to one trend. Piracy becomes more prominent during the absence of strong political entities in a given region and vice versa.
Piracy was already a problem at the beginning of the 1st century BCE, before the Mithridatic wars\textsuperscript{101} began, but became worse during the course of them. The pirates were successful enough to hire and attract the most skilled sailors as well as build light and speedy ships that suited their purposes. Their success was further displayed by apparently ostentatious use of sumptuous and extravagant materials to outfit their ships. The pirates had a fleet of more than a thousand ships and captured 400 cities, actions suggesting organized effort.\textsuperscript{102} They were reported to have commonly ransomed and mocked people whom they had captured including high-ranking Romans.\textsuperscript{103}

Εἶτα Ῥωμαίοι ἐν τοῖς ἐμφυλίοις πολέμωις περὶ θύρας τῆς Ῥωμῆς συμπεσόντων, ἔρημος ὅσα φρουρᾶς ἢ θαλάσσα κατὰ μικρόν αὐτοῖς ἑρείκετο καὶ προῆγεν, οὐκέτι τοῖς πλέουσι μὸνον ἐπιθυμεμένοις, ἀλλὰ καὶ νήσους καὶ πόλεις παραλλότερος ἐκκόπτοντας. ἥδη δὲ καὶ χρήματα δυνατοὶ καὶ γένεσι λαμπροὶ καὶ τὸ φρονεῖν ἀξιούμενοι διαφέρειν ἄνδρες ἐνέβαινον εἰς τὰ ληστηρικὰ καὶ μετείχον, ὡς καὶ δόξαν τινὰ καὶ φιλοτιμίαν τοῦ ἐργου φέροντος.\textsuperscript{104}

The account goes on to state how Pompey was given exceptional resources and powers to eliminate the threat. The Romans supplied him with a massive fleet, a large operational budget, and authority over all the waterways and coastal areas up to several kilometers inland to regain control of the regions in question, which he ultimately did. After Pompey’s efforts, additional work was done by the emperors that diminished piracy and vandalism and thereby secured trade routes, although it would always be a factor.\textsuperscript{105} They established a permanent navy that patrolled for piracy and helped ferry troops and supplies, and built naval bases in strategic locations all around the Mediterranean.\textsuperscript{106}

The Battle of Actium marked the transition from the late Republic period to the Roman Empire. In the September 31 BCE, Octavian’s forces routed those of Antony and Cleopatra. Octavian’s resources and navy were more limited than Antony’s, who had enormous resources of

\textsuperscript{101} A series of wars which lasted form 88 to 85 BCE, 83-81, and 74 BCE respectively.
\textsuperscript{102} Plutarch. Pompey, 24.4
\textsuperscript{103} Plutarch. Pompey, 24.6
\textsuperscript{104} Plutarch. Pompey, 24. 2.
\textsuperscript{105} Sextus Pompey used piracy as a form of guerilla resistance against Octavian.
\textsuperscript{106} Casson 121.
ships, men, and money, because he ‘held the east in fee.’ Agrippa, Octavian’s general, outsmarted Antony by trapping his fleet in the bay. Seeing the impending loss, Octavian’s enemies escaped to Egypt, and left a massive but leaderless force to surrender. The suicides of Antony and Cleopatra in 30 BCE officially ended two decades of civil war, but Octavian would promote the Battle of Actium as the decisive moment of victory. To commemorate the event and its importance, he founded Nicopolis on the northern side of the gulf and renovating a preexisting temple to Apollo and added monumental naval trophies. Strabo describes the ship-shed shrines that he dedicated:

Ἐφεξῆς δὲ τὸ στόμα τοῦ Ἀμβρακικοῦ κόλπου: τούτου δὲ τοῦ κόλπου τὸ μὲν στόμα μικρὸ τοῦ τετρασταδίου μεῖζον, ὁ δὲ κύκλος και τριακοσίων σταδίων, εὐλίμνεος δὲ πάς. Οἴκουσι δὲ τὰ μὲν ἐν δεξιᾷ εἰσπλέουσι τῶν Ἑλλήνων Λακράννας: καὶ ἱερὸν τοῦ Ἄκτιου Ἀπάλλωςος ἐνταθά ἐστι πλησίον τοῦ στόματος, λόφος τις ἐφ’ ὁ νεώς, καὶ ὑπ’ αὐτῷ πεδίον ἄλοσος ἔχον και νεώρια, ἐν οἷς ἀνέβηκε Καίσαρ τὴν δεκαάτην ἀκροθύνιαν, ἀπὸ μυκοκρότου μέχρι δεκήρους: ὕπὸ πυρὸς δ’ ἠφανίσθαι καὶ οἱ νεώθοικοι λέγονται καὶ τὰ πλοῖα.

Given Rome’s previous avoidance of seaborne activity, the fact that a naval battle punctuated the termination of the republic and the emergence of the empire is significant, and the newly titled Augustus would capitalize on the exceptionality of this event. Moreover, it pitted the naval forces of Rome proper against the naval forces of the near east as mustered by Antony and Cleopatra, in one stroke eliminating finally the prominence of the near eastern cities’ maritime power and eliminating the need for Rome to have a standing traditional navy. Not only was it a decisive turning point in history, resulting in changes to how naval warfare would be conducted for the next several centuries, it also became a symbol and theme in the literature of the age. The depictions of the battle in Augustan literature suggest a lingering mix of positive and negative attitudes towards such a maritime engagement. Horace’s 9th epode focuses on Actium, in Ode III. 4 Horace associated Augustus’s victory with Jupiter’s victory over the giants, a slightly different.

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108 Strabo 7.7.6.
attitude appears in Ode 1.37 although it covers the same topic. Propertius poem IV takes on the
subject with flare and hyperbole:

For example, one ‘origin’ leads into a narrative of the battle of Actium, and it is told, not
parodically (as some think), but exactly as a Roman Callimachus should tell it; the exotic,
rococo result would have caused Propertius much pleasure and the Emperor no pain.¹⁰⁹

Contemporary Roman authors, especially those in Maecenas’s circles had to disguise and mask
ill-opinion of the event with great care. The whole incident was deliberately spun so that the fo-
cus was not on civil war against Antony, but as external struggle of a Roman Magistrate against
the non-Roman, womanly, and eastern Cleopatra. Indeed, both dissent and flattery had to be deli-
cately approached when this naval battle was discussed. The Battle of Actium appears in Virgil’s
_Aeneid_ as a vignette; the battle appears “in the centre, brilliantly represented as tableau, not narra-
tive” on the shield which Vulcan forged for Aeneas.¹¹⁰ Nevertheless, the topic was never fully
treated the epic genre:

To intrude divine councils and interventions into very recent history would be a jarring
fault of taste, constantly risking bathos and absurdity; so too would the representation of
Augustus mowing down thousands with his own strong right arm. Again, the plain fact
was that the battle of Actium was unsatisfactory as a theme for verse…there was also ap-
parently hardly any fighting, some contingents changing sides at the last moment and
Cleopatra suddenly sailing away in flight.¹¹¹

The tremendous caution that authors had to take with covering the subject may have in part been
affected by the fact that it was a naval battle, not the traditional form of warfare for the Roman
military apparatus.

**Attitudes Towards Seafaring in Roman Literature**

The literature of the Augustan era reveals several opinionated perspectives about the sea,
seafaring, and maritime trade. These are presented as stock cultural attitudes, or at least certain
tropes, include the association of merchant seafaring activity with greed and hubris as well as the
inherent risk of loss through either piracy or shipwreck. Obviously, however, every roman citizen

¹⁰⁹ Boardman Griffin, and Murray 234.
¹¹⁰ Boardman Griffin, and Murray 265.
¹¹¹ Boardman Griffin, and Murray 259.
did not agree with the sentiments put forth in the literary arts which catered to elite audiences. The following review will include a very limited selection of ancient authors from the first centuries of the Roman Empire, given the breadth of literature that is passed down extent from that era, but the passages selected will emphasize duly the themes of greed and risk.

If the travelers of antiquity were successful in evading pirates, they still had to contend with the high possibility of shipwreck. It comes as no surprise that shipwrecks occurred with some frequency in antiquity, as tales of shipwrecks and close calls abound in ancient literature: survival stories of storm beaten sailors were present in ancient Egyptian myth, in the Homeric epics, and from biblical scripture. Roman literature also has no shortage of such accounts. Virgil’s *Aeneid* began with the narrative of a shipwreck, vividly and emotionally rendered. Winds and waves battered Aeneas’s fleet and wrecked them off the shores of Dido’s kingdom. Virgil portrays the fear and anxiety of the situation when he describes Aeneas clinging to the deck and crying that he would have preferred to have died in battle rather than drown at sea. Meanwhile, members of his crew are swept off the boat and lost into the water, the wind, and waves. *Naufragia*, or shipwreck, was even the term that was used to describe gruesome collisions of chariots in the circuses. In much of the Augustan poetry, shipping and seafaring were synonymous with wealth and greed. It appears as a theme in many of Horace’s Odes and Epodes. Shipping was certainly a means of making profit, and the desire for profit in and of itself was not necessarily frowned upon in Rome, but it becomes a characterization and trope in literature.

In addition to the fictional and mythological narratives, some historical accounts of shipwreck survivors are handed down from the Roman times. Yosef ben Matityahu (37 – 100 CE), better known by his Roman name Titus Josephus Flavius was a Romano-Jewish historian whose works give modern scholars valuable insight into Roman, Judean, and Christian culture during the 1st century CE. During his lifetime, he journeyed by ship from the province of Judea to Rome several times. On one occasion, while he was on a mission to provide legal defense to some of his

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112 Virgil. *Aeneid* 1.81-123
fellow religious officials at Rome, the vessel on which he was traveling was caught in a storm and sank. The account from his autobiography not only gives an eyewitness account, but also describes the ship in some detail:

Met’ eikostón dè kai ἐκτὸν ἐνιαυτὸν εἰς Ῥώμην μοι συνέπεσεν ἀναβηγμα διὰ τὴν λεχθησομένην αἰτίαν: καθ’ ὅν χρόνον Φήλιξ τῆς Ἰουδαίας ἐπετρόπευεν ιέρεῖς τινας συνήθεις ἐμοὶ καλοὺς κάγαθοὺς διά μικρὸν καὶ τὴν τυχοῦσαν αἰτίαν ὅποιας εἰς τὴν Ῥώμην ἐπέμψε πλὴν ὑψώχοντας τῷ Καίσαρι. αἷς ἐγὼ πόρον εὑρέσθαι βουλόμενος σωτηρίας, μάλιστα δὲ πυθόμενος ὅτι καίπερ ἐν κακοῖς ὄντες οὐκ ἐπελάθοντο τῆς εἰς τὸ θείον εὐσεβείας, διατρέφοντο δὲ σύκοις καὶ καρυοῖς. ἀφικόμισας εἰς τὴν Ῥώμην πολλὰ κινδυνεύσας κατὰ πάλασαν. ἦκασθεντος γὰρ ἡμῶν τὸ πλοῖον κατὰ μέσον τὸν Ἀδριαν περὶ ἐξακοσίους τὸν ἀριθμὸν ὄντες δι’ ὀλίς τῆς νυκτὸς ἐνοχῆμεν, καὶ περὶ ἀρχομένην ἠμέραν ἐπιφανέντος ἡμῖν κατὰ θεοῦ πρόνοιαν Κυρηναϊκὸ πλοῖον φθάναντες τούς ἄλλους ἐγὼ τε καὶ τινὲς ἐπερὶ περί οἰκοῦντα σύμπαντες ἀνεληφθῆμεν εἰς τὸ πλοῖον. διασωθεὶς δ’ εἰς τὴν Δικαιάρχειαν, ἦν Ποτίολου Ἰταλοῦ καλοῦσιν…

The size of the ship must have been quite large and extensive if we are told that of six hundred passengers were on board, only eighty survived the wreck. The path of the vessel described was indicative not only of the trade pattern but also of the size of ships. We presume that the vessel left from Caesarea, one of the largest ports in the world at that time, and proceeded north-west to the Adriatic Sea. Whether or not it was the intended destination of the original vessel, the passengers eventually arrived at Puteoli, which was one of the largest ports in Italy before the enlargement and expansion of the marine facilities at Ostia. A ship that large would need adequate mooring and docking facilities that only an extensive harbor like Caesarea, Puteoli, or Ostia could provide.

A very similar account can be found in the New Testament with the life of Saint Paul. A passage from the Book of Acts detailed the voyage of Paul from Caesarea to Rome. The ship embarked late in the sailing season, because the captain and the investors hoped to make one final haul in spite of Paul’s warnings to stay in harbor until more favorable weather. The passage suggests that a motivation for profit was directly related to the calamity that followed, again with only a fraction of the many passengers making it to safety. This account comes from outside of

113 Josephus Flavius. Life. 3.
114 Acts 27.
the Roman tradition but was embedded in the larger political and economic conditions of the time period. We see an extremely large ship leaving from Caesarea, decisions that prioritized chance of profit over the risk of loss. Apparently shipwreck and piracy were considered risks worth taking because of the possibility to gain considerable wealth through maritime trade. Yet the deliberation of the cost to benefit ratio was not often discussed, and instead maritime activity was considered the result of greed and hubris.

Marine insurance developed in Rome to protect merchants and crews from loss of investment in the relatively probable event of shipwreck. The Roman state even became involved as one of the primary insurers during the Second Punic War. Livy tells us that there were certain conditions private lenders wanted to be guaranteed of before lending money to the army for the war effort:

\begin{quote}
Ubi ea dies venit; ad conducendum tres societates aderant hominum undeviginti, quorum duo postulata fuere: unum ut militia vacarent, dum in eo publico essent, alterum ut quae in naves imposuissent ab hostium tempestatisque vi publico periculo essent.\footnote{Livy 23.49.1-3.}
\end{quote}

It took no time at all for people to take advantage of this system of public insurance, because shipwrecks were so common and frequent. Again it is a snippet from Livy\footnote{Livy 25. 3. 9-13.} that clues us in to this practice: the tribunes and other public officials began seeking high fines for anyone discovered to have fraudulently collected the insurance payout, and the increasing pressure and scrutiny encouraged two publicans to contrive actual shipwrecks to collect the funds: \textit{In veteres quassasque naves paucis et parvi pretii rebus impositis, cum mersissent eas in alto exceptis in praeparatas scaphas nautis, multiplices fuisse merces ementiebantur.}\footnote{Livy 25. 3. 11.}

This instance of public involvement in maritime shipping characterized the overarching idea that maritime activity and by proxy maritime insurance was an area in which particularly greedy people sought to make money through nefarious means. While this was obviously not true in every situation, the sentiments carried over into subsequent law and literature.
Laws and Class

Legal documents confirmed and codified certain facets of the Roman relationship with maritime culture that we have seen expressed in literature. Laws are often a reflexive reaction to either real behavioral issues or reactionary measures against perceived violations of cultural standards. The legal system and class were inherently linked in ancient Rome, with higher status corresponding to greater protections, and conversely low status being marked by restricted legal protections. Thus the laws regarding ships and seafaring indicate certain classist ideologies shipping invoked in certain social circles.

The Lex Claudia, passed in 218/217 BC, stated that no senator could own a sea-going ship with a carrying capacity greater that seven tons.\textsuperscript{118} The law was proposed by the tribune Q. Claudius:

\begin{quote}
Invisus etiam patribus erat ob novam legem, quam Q. Claudius tribunus plebis adversus senatum atque uno patrum adiuvante C. Flaminio tulerat, ne quis senator cuive senator pater fuisse maritimam naven, quae plus quam trecentarum amphorarum esset, haberet. id satis habitum ad fructus ex agris vectandos; quaestus omnis patribus indecorus visus. res per summam contentionem acta invidiam apud nobilitatem suasori legis Flaminio, favorem apud plebem alterumque inde consulatum peperit.\textsuperscript{119}
\end{quote}

This measure made the prejudice official; it restricted senatorial families from owning vessels over a certain tonnage, basically anything more than a vessel for personal transportation, and therefore profit through maritime trade, leaving this field open to the equestrian class. Senators in their highly public role were expected to have wealth through land holdings or military success, the traditional means, and to use that wealth in a manner that reflected their commitment to public service. Seafaring and its obvious connection with trade and business was seen as greedy and the pursuit of personal gain which was theoretically in opposition to the ideal role of senators. The result of this law was not simply to exclude senators; it gave the equestrian class control over

\textsuperscript{118} If each amphora weights about six gallons, and there are three hundred amphora, then this works out to be about seven tons, which was not large compared to merchant vessels even in the classical era and earlier, let alone the larger ships active during the Roman Empire.

\textsuperscript{119} Livy 21.63.3-5.
maritime trade, thus creating an influx of wealth among members of that class. The lasting effect of this bill would be the position of maritime trade as a divisive focal point in class conflict.

Cultural attitudes toward seafaring and their corresponding class connotations were to be found in the literature of the early Empire. In particular, the genre of satire used the association between class, shipping, and wealth to criticize certain aspects of contemporary Roman society. One of the most memorable passages, from Petronius’ *Satyricon*, focused on the lavish, even gaudy, dinner party of the freedman Trimalchio. Part of the irony and humor of the section is that this man has acquired tremendous wealth, surpassing the resources of many free-born citizens, but is constrained in status and position because he had been a slave. The characterization in the passage reflects class prejudice and a bias against ‘new money’; this in turn is clearly paired with one of the key ways that Trimalchio made his fortunes: ships and shipping.


Petronius’s treatment of the character Trimalchio and his associates underscores the connection between the Roman prejudice against seafaring and the anxieties of ‘traditional’ Roman values and identity.

Another place where one might find a connection between social class and maritime activity is in graffiti. Pompeii is one of the richest sources for Roman graffiti because of the eruption of Vesuvius in the first century CE. The volcanic material preserved the ancient Roman city in great detail, in particular we have many surviving fragments of graffiti that were inscribed on the walls by local Pompeians. In a review of the graffiti from Pompeii, I have found a series of

\(^{120}\) Petronius. *Satyricon*. 76.
signatures and phrases that were scratched onto walls in a way that simultaneously resemble a drawing of a ship; I call them ship-image-signatures. (see appendix; table 2). While the conclusions from such a limited sample pool are tenuous, I believe that there are certain class implications to be found within this body of material. Few of the names are the traditional Roman cognomina; moreover many of them are either written in Greek or clearly influenced by Greek. These graffiti were found primarily in public places near the sea and river gates; they are not found in the most opulent houses. They are of course characterized by a degree of literacy necessary for reading and writing. All these factors would indicate to me that they belong to individuals of some class, but not to the most elite Roman citizens of Pompeii.

The result of the early republican policy restricting the ownership of merchant vessels was a conflict between high status and high wealth in the upper divisions of Roman society. The policy allowed freedmen and equestrians to become enormously wealthy, wealthier often than patricians and those from senatorial families. Thus, when wealth and status were not in alignment, we see a reactionary attitude put forth by the senatorial class that condemned the lucrative venture which they were barred from. The anxiety of elites fearing that their power base would be sucked out from underneath them by men with more resources accounts for this apparent hypocrisy that the Romans exhibited in their attitudes towards seafaring. The prosperous economic conditions of the period and the corresponding increase in trans-Mediterranean shipping made the conflict salient.

Pax Romana

In spite of a general Roman attitude of indifference or disdain for seafaring, there were certain factors about the Roman Empire that made the first and second centuries CE a prime period for the development of faster, stronger merchant ships. These factors can be distilled to two main themes: the political and military stability of Pax Romana (Roman peace) and the wealth and stability of the Roman economy. Military and political control of the whole Mediterranean region minimized conflicts between cities and peoples. That peace in turn allowed trade and
prosperity to flourish. The two themes are directly correlated, but for the purposes of this study it is helpful to tease them out separately.

Augustus secured an enduring peace after he defeated Antony and Cleopatra at the Battle of Actium. The centuries of peace that resulted came about after centuries of warfare between city-states in Greece and the Levant as well as decades of Roman civil war. This represented the first and only time period in which all of the lands and cultures around the Mediterranean – and indeed well beyond the confines of the Mediterranean littoral in some areas – had been brought together under a single political entity. One can make the assumption that state directed innovation of naval technology was minimal during the early empire. Competition necessitates innovation, but from a military standpoint, there was little need for Rome to pursue technological improvements, because after the battle of Actium Rome had no major competition. *Pax Romana* gave them control over much of the coastal areas in and around the Mediterranean basin, and allowed them to curtail conquered peoples ability to maintain large naval forces. Instead, it was economic competition that produced innovation during this period; construction methods changed as the size and cargo capacity of vessels were enlarged as a response to economic growth and opportunity.

*Pax Romana* and imperialism concentrated wealth of Rome from conquest and taxes and thus allowed Rome to import expensive and exotic goods. Stability on all ends of production, exchange, and consumption networks helped keep costs down and demand steady. The golden areas of the silk road occurred when there was stability on both ends of the trade routes, in fact one of the greatest golden eras of the silk road occurred during the early roman empire. This is particularly the case for maritime trade because stable, powerful governments are able to control piracy, but piracy rises when there is no central authority or political power to stop them. The Roman Empire from 32 BCE to 400 AD represented the first time that all of the lands and peoples surrounding the Mediterranean Sea were unified under one centralized authority, no power had been able to achieve this before the Romans and none have accomplished it since.
Moreover, Pax Romana and the spread of the Roman Empire made this era safer and more favorable for travel. That is one of the reasons that this era was considered one of the golden eras of Silk Road trade. Rome was engaged in the exchange of commodities with exotic locations like India, and this was made possible by a pronounced increase in maritime transport of the Indian Ocean and the Red Sea. Thus we can look for a corresponding increase and dynamism of maritime activity Mediterranean itself. One of the crucial influences of Pax Romana on maritime trade was increased access to friendly and prosperous ports. Additionally, the economic conditions of this era encouraged the construction of larger ships with increased tonnage, which specialized in single commodity shipments. This trend correlates with changes in hull construction and the development of new structural reinforcement methods. Rome was importing exotica from all over the world in large quantities. A particularly lively, if overly obvious in its hyperbole, account can be found in the stock orations of Aelius Aristides.

The economy of Italy drastically changed after the Punic Wars and again during the Empire. The spread of Roman imperial domination coincided with an influx of tribute, taxes, and

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122 Aelius Aristides 14.200.
especially plunder from the provinces, thereby increasing wealth in the capital. This wealth was, however, concentrated in the hands of a few men of high-ranking political or military influence. Simultaneously there was a growing urban poor population, driven to the city as the land was re-distributed to large plantation owners. The high concentration of urban poor were assisted by grain doles made available by men running for office in hopes of gaining favor and therefore votes. The *annona*, or grain doles, were started by Gaius Sempronius Gracchus, a *popularis* politician, in 123 BCE and caused much political tension. In his satires, Juvenal coins a phrase that would come to characterize the leverage of the grain doles as the relationship between the poor citizen and the elite politicos:

\[
\text{iam pridem, ex quo suffragia nulli / uendimus, effudit curas; nam qui dabat olim} / \text{imperium, fasces, legiones, omnia, nunc se /continet atque duas tantum res anxius optat, / panem et circenses.}
\]

The degree to which these handouts or subsidizations of grain were actually helpful to those living in poverty in the city is a matter of debate, nevertheless they must have occurred with some frequency, especially in the Imperial period when autocratic emperors took over this role after the Augustan era and provided many of the same services. The immediate hinterlands of Rome could not supply the need for grain in the city; it had to be imported from the provinces. Grain imports became a basic component of the economy and politics of the city. That the grain arrived from the provinces on massive ships is attested by several authors of the late Roman period. The ship on which Paul sails in Acts 27; Lucian’s massive ship the Isis, and the so called Alexandrian vessels are all examples of the appearance of massive cargo vessels that specialized in carrying grain. These accounts, it must be noted, although they are somewhat frequent, are of course highlighted because of the impressiveness of the vessels and the human tendency to gravitate towards the large and flashy. It is even suggested in some places that these vessels traveled as a fleet. “There were enough ships in the fleet to transport 150,000 tons of Egyptian wheat annually.”

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123 Juvenal, Satire 10.77–8.
124 Casson 170.
general consensus of the accounts shows us that massive ships were being built, even if they were not representative of the larger sample of all ships active first centuries CE:

Such great ships are developed in response to particular situations – abnormally large markets, for example, or unusually long distances, or a demand for especially heavy or bulky commodities and generally where there is a particular concentration of wealth and power, as in a wealthy city or maritime state, or because of the presence of a ruler and his court.¹²⁵

As a result of the demand for grain in Rome, ships were being built that could carry large quantities of a single item all the way from Alexandria to Rome.

Quin et dissimulandis rerum externarum curis Nero frumentum plebis vetustate corruptum in Tiberim iecit quo securitatem annonae sustentaret. cuius pretio nihil additum est, quamvis ducentas ferme navis portu in ipso violentia tempestatis et centum alias Tiberi subvectas fortuitus ignis absumpsisset.¹²⁶

This passage not only indicates the connection between the grain supply and the passage because of the juxtaposition it also demonstrates the incredible number of ships that were involved in the grain supply trade and also the facilities of the harbor at the time.

The abundance of merchant ships and the increasing size of such vessels correlates with the establishment of permanent facilities at sites known to be preeminent trade emporia. Large port facilities were needed for large ships, but exceptionally large and developed ports like Ostia or Caesaria or Alexandria were uncommon and exceptional.¹²⁷ Although the large structures got a lot of attention from contemporary commentators, they were anomalous, and more modest ships and ports must have been the norm. For much of antiquity, port facilities were minimal; in fact there are many ancient towns that probably had little to no harbor facilities. Ships could be anchored, pulled ashore, or unloaded in the shallows. None of this required docks, quays, breakwaters, or other man-made structure; where there was no construction, nothing remains in the material record for archaeologists to study. The scale of ships and the use of natural harbors is hard for us to imagine now, as Houston points out in his article: “as we move ever more deeply into an age

¹²⁵ Houston 556.
¹²⁶ Tacitus Annales 15.18.3.
¹²⁷ Houston 553.
of technical marvels, it becomes increasingly difficult to comprehend the nature, and especially the scale of the ancient world. Thus much of maritime trade in antiquity is invisible when it comes to studying ports, yet there were a number of incredibly large ports that operated in the Roman era to cater to the large ships that did exist.

Ostia, Rome’s port city, became the largest trading port of the Roman world during the 1st and 2nd centuries CE. The region was a natural harbor.

The area had served as an entrepot for centuries with its natural harbor and river access, however the Julio-Claudian emperors installed major port facilities and permanent breakwaters.

The vessel used to move the Egyptian Obelisk to Rome must have been massive to carry the weight of the stone and to stay even keeled on the journey. The use of the vessel after the fact to make a breakwater indicates the investment of the Emperor Claudius to make the overall harbor facility more traffic friendly. With the various developments in the harbor at Ostia, including permanent quays, docks, storage facilities, and breakwater barriers; we see the Romans begin to embrace the maritime trade that they had come to depend on.

**Conclusion**

The Romans historically proved to be highly resistant to involvement in seafaring. The location of the city inland indicates an orientation to the land. Intentionally, the Romans did not

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128 Houston 553.
129 Strabo 5.3.5.
get engage in naval activity until 261 BCE. They did so only out of necessity during the first Punic War, and would fail miserably at anticipating storms and avoiding reefs on a number of occasions; ship construction and seamanship had historically been a realm in which Rome’s enemies excelled. Moreover, there was a deeply entrenched belief that maritime activity was not proper conduct for aristocratic Romans to be engaged with because of its association with mercantile activity and therefore greed. Much of this chapter has focused on the negative attitudes that are expressed in roman history, politics and literature towards seafaring, but the final segment about *pax romana* and the grain dole clearly indicates that Rome became dependant on goods imported via oversea routes. Thus the Romans found themselves in a position that was contradictory to this nostalgic self-image, where on the one hand the Romans touted an attachment to the land, but on the other they became increasingly involved in seafaring.

Nevertheless, one of the greatest transformations to occur in ship building technology during antiquity was the shift from hull-based construction to skeleton-based construction; it essentially demarcates the difference between ancient and modern ship construction philosophy. The manner in which hull’s side planks were connected was also related to general size of ships, type of cargo, anchor usage, and port selection. This process occurred gradually over the period during which the Roman Empire held the Mediterranean Sea basin. It can be argued that each shipwreck is an example of design that was indicative of activity throughout the entire Mediterranean; thus these demonstrate not a “Roman maritime culture” but a larger, Mediterranean maritime culture. That this change happened under the Romans is surprising, however, because of the contentious relationship that they maintained with ships and seafaring. The effect was unintentional, rather it occurred as a consequence of changing social, political, and economic conditions.

The Roman Empire was the first time in history that the whole Mediterranean basin was united

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130 Although there is a section of historical review that discusses the regal period and the Roman Republic, much of my focus will be on the early Roman Empire from 100 BCE to 200 CE. I have decided to focus on this era because there was a dramatic increase in trade during the first two centuries following Augustus’s consolidation of power in Rome. The evidence during this period tends to be more abundance, in all disciplines and the period correlates to the innovations on which the first chapter focuses.
under one political entity, thus fostering an environment for robust trade and improvements to trade volume.
Appendix 1: Images

Image 1: Mortise – and – Tenon Construction

Image 1: Two images of Mortise–and–Tenon Construction. The image on the right illustrates the classical method of edge-joining planks with mortises, tenons, and dowels. The photo on the left is a segment of LBA shipwreck using this technique. (Lionel Casson)

Image 2: Lake Nemi Ship

Image 2: One of two Lake Nemi Ships before destruction. The dimensions, long and wide with a shallow draw, were ideal for supporting structures.
Image 3: Anchors

This chart from Cemal Pulak’s speech at the metropolitan museum of Art demonstrates the evolution of anchors in the Mediterranean over time. A. Stone Anchor typical of the Bronze Age. B. Wooden hooked anchor with stone stock. C. Wooden hooked anchor with wooden stock filled with led plugs. From classical era. D. Wooden anchor stock with iron stock from 1st C BCE. E and F. Iron Hooked Anchors from Roman era (E) and Byzantine era (F).
Image 4: Chart made by Dr. A.J. Parker of Bristol University demonstrating the temporal distribution of shipwrecks found in the Mediterranean during the first 30 years of underwater exploration. (http://www.abc.se/~pa/publ/icmm-00.htm)

Image 5: Corvus illustration demonstrates the mechanism for boarding enemy vessels. (http://jskonrad.com/middlerepublic264to202BC.aspx)
### Appendix II: Chart of Construction Method Change Over Time

<table>
<thead>
<tr>
<th>Wreck Site</th>
<th>Date</th>
<th>Construction</th>
<th>Size/ Tonnage</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uluburun, Turkey</td>
<td>14th c BCE</td>
<td>Large Mortise-and-Tenon</td>
<td></td>
<td>Pulak 1988</td>
</tr>
<tr>
<td>Bon-Porté, France</td>
<td>6th c BCE</td>
<td>Mortise-and-Tenon</td>
<td>10m; 6 tons</td>
<td>Houston</td>
</tr>
<tr>
<td>Tektas Burnu, Turkey</td>
<td>5th c BCE</td>
<td>Mortise-and Tenon</td>
<td>12m; 7 tons</td>
<td>Carslon</td>
</tr>
<tr>
<td>Kyrenia</td>
<td>4th C BCE</td>
<td>Small Mortise and Tenon</td>
<td></td>
<td>Throckmorton</td>
</tr>
<tr>
<td>Kizilburun</td>
<td>2nd C BCE</td>
<td>Mortise and Tenon</td>
<td></td>
<td>Cemal Pulak</td>
</tr>
<tr>
<td>Antikythera</td>
<td>1st C BCE</td>
<td>Mortise-and-Tenon</td>
<td>Marble Materials</td>
<td>Throckmorton</td>
</tr>
<tr>
<td>Lake Nemi Boats</td>
<td>1st C CE</td>
<td>Mortise and Tenon with metal nails.</td>
<td>234m, 240m</td>
<td>Throckmorton</td>
</tr>
<tr>
<td>Sea of Galilee Boat</td>
<td>1st -2nd C CE</td>
<td>Mortise-and-tenon with rough treenails and metal nails.</td>
<td>8.5m</td>
<td>Wachsmann 2000</td>
</tr>
<tr>
<td>Yassiada II</td>
<td>4th C CE</td>
<td>Widely spaces Mortise and Tenon</td>
<td></td>
<td>Cemal Pulak</td>
</tr>
<tr>
<td>Yassiada I</td>
<td>6th C CE</td>
<td>Widely spaced Pegs</td>
<td></td>
<td>Cemal Pulak</td>
</tr>
</tbody>
</table>
**Appendix III: Ship-Image Graffiti (15)**

All images included are authors copies of the entrees found in the CIL volume IV. These images are my reproductions of graffiti found in Pompeii and compiled in the CIL which were both words or names and images. They suggest a degree of class and ethnic affiliation within the shipping community of Pompeii during the first century AD. The names are not traditional Roman names, and many of the phrases, names, and characters have clear Greek influences.

<table>
<thead>
<tr>
<th>1. CIL IV 4110 (V, 2, in peristylii)</th>
<th>2. CIL IV 4111 (V, 2, in peristylii)</th>
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<tbody>
<tr>
<td>“Siletionnus”</td>
<td>“Siletioellus”</td>
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<th>3. CIL IV 4225 (I, v, 4)</th>
<th>4. CIL IV 4668 (VI, 15, 11)</th>
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<td>“(Th)alassae fusa optatus”</td>
<td>“Fortuna”</td>
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<th>6. CIL IV 4742 VII, vii, in peristylii</th>
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<tbody>
<tr>
<td>“Cresces Architectus”</td>
<td>Cresces Spatulo(s) Sal(ute)</td>
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<tr>
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<th>8. CIL IV 5371 IX, - , -</th>
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<tr>
<td>Cresces Architectus</td>
<td>Arruntius</td>
</tr>
<tr>
<td></td>
<td>CIL IV 5428 (unknown)</td>
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<td></td>
<td>CIL IV 8020</td>
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<tr>
<td></td>
<td>“Venusius”</td>
</tr>
<tr>
<td></td>
<td>CIL IV 8161 (I, vii, 8)</td>
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<tr>
<td></td>
<td>CIL IV 8396 (I, x, 11)</td>
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<td></td>
<td>CIL IV 8991</td>
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<td>CIL IV 9039</td>
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<td>CIL IV 10036 I, xii, 3</td>
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